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ENVIRONMENTAL IMPACT STATEMENT

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ROSEBUD COUNTY, MONTANA

Montana Department of State Lands

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ENVIRONMENTAL IMPACT STATEMENT

MONTCO MINE

ROSEBUD COUNTY, MONTANA

Montana Department of State Lands
July 1984

Dennis Hemmer

Dennis Hemmer, Commissioner

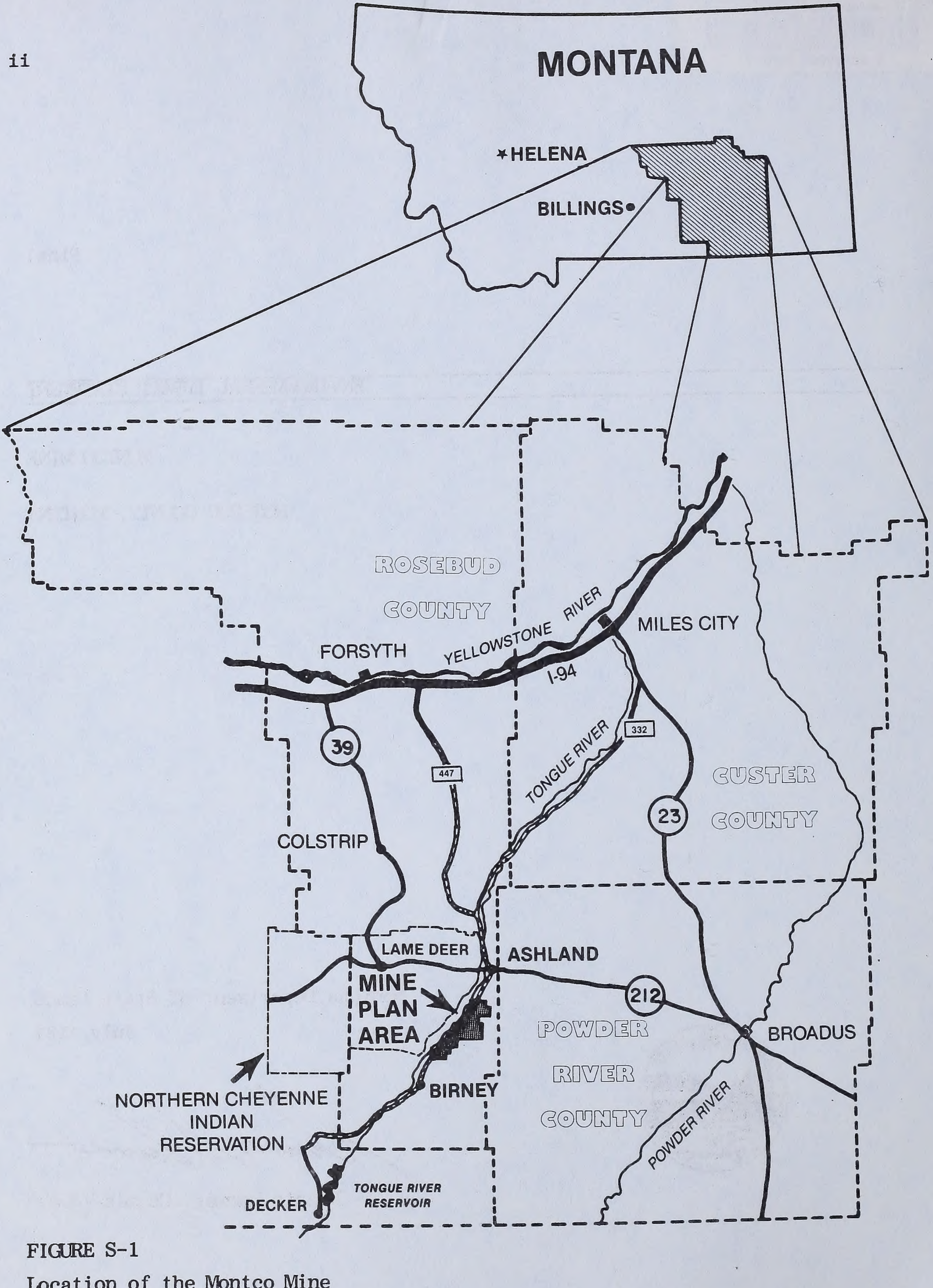

FIGURE S-1
Location of the Montco Mine

MONTCO MINE

ROSEBUD COUNTY, MONTANA

In May 1982 the Department of State Lands issued a draft environmental impact statement (EIS) on the proposed Montco Mine. The draft document was revised, and this final EIS is the result.

Action Under Consideration

Montco proposes to open a coal strip mine in the Tongue River Valley, Rosebud County, Montana (fig. S-1). The Commissioner of State Lands must decide whether to approve the permit as applied for by Montco, deny the permit, or approve the permit subject to stipulations.

The Company's Proposal

Montco proposes to mine 186.1 million tons of coal over 24 years at a maximum rate of 12 million tons per year from both private and State coal leases. The entire mine plan area covers 10,171 acres, of which 5,322 would be disturbed for mining, roads, and soil and overburden stockpiles and 218 would be disturbed for facilities.

The current permit application covers only the first five years of the mine's life (although the mining and reclamation plan covers the first 11 years). Six hundred thirty acres would be disturbed by mining, roads, facilities, and soil and overburden stockpiles under the plan contained in the application.

Summary of Impacts

Geology. Geologic impacts of mining in the North King mining unit would be limited primarily to largely unavoidable erosion of topsoil from the longer and steeper reclaimed slopes. Reclamation over the remainder of Montco's mine plan area would probably cause similar geologic impacts, although this cannot be determined with certainty at this time.

Adequate favorable overburden exists in the North King unit to cover the regraded spoil to a depth of 8 feet. Montco's overburden handling plans would most likely allow for adequate separation of favorable from unfavorable overburden. It is possible that unfavorable overburden materials could still end up in the rootzone in small, localized areas, and this could affect postmining vegetative quality. However, Montco could be required to correct such areas, depending on their size and extent.

Hydrology. Montco's surface drainage control plan may allow some surface runoff and sediment to leave the permit area during initial mining and operation phases in the North King unit in response to extreme runoff events. Impacts would be localized and short term.

Sandstone units known to overlie and underlie coal seams in the North King unit may cause initial pit inflows greater than those calculated from the coal seams. In such instances, discharges from ponds designed to treat pit pumpage may not meet water quality standards.

Reestablishment of the ground water flow regime through spoil following mining may eventually cause increased dissolved solids concentrations in Tongue River streamflow. Theoretical increases during low flow conditions could probably not be measured due to mining the North King unit, and increases due to mining Montco's entire mine plan area also could not be measured in the river. Streamflows greater than low flow conditions would effectively dilute increases even more. Cumulative hydrologic impacts resulting from mining by Montco, in conjunction with mining above the Tongue River Dam, would therefore have no adverse impacts on agricultural water uses.

Neither mining in the North King unit nor construction of the facilities or railroad loop would result in measurable impacts on the Tongue River hydrologic system. McKelvey Spring may dry up as a result of mining the North King unit. It is uncertain whether it would flow again following reclamation.

Extreme flood flows in King Creek could damage a sediment pond. The railroad loop embankment, however, would be above projected flood water level elevations and would not be affected.

Ground water quality in resaturated, backfilled spoil would probably be degraded. However, other ground water sources exist in the area.

Soils. Montco would salvage enough good quality soil for successful overall plant growth after reclamation. But prolonged storage, especially in the facilities area, would biologically degrade the soil, and this could lead to lower postmining vegetative vigor and diversity for an unknown time period.

Unavoidable soil impacts would include loss of the natural soil profile, soil structure, pore space, pore continuity, and a reduction in organic matter concentration. As a result, the land would probably be more sensitive to mismanagement and drought for perhaps several decades after mining. Long-term impacts (more than several decades) are uncertain, owing to inadequate information on the practices required for long-term success.

Vegetation. Based on Montco's reclamation plan, revegetation failure is highly unlikely. Even so, biological impacts from prolonged soil storage, especially in the proposed facilities area, could lower plant species diversity and productivity for an unknown period of time after reclamation. Moreover, a small chance exists that some unfavorable overburden could be placed in the rootzone, resulting in small, isolated areas of stunted plants or sparse vegetation.

Aquatic Biology. Aquatic habitats within the North King mining unit would be removed without detrimental effects to regional aquatic ecosystems. No significant degradation of water quality or aquatic populations in the Tongue River is anticipated.

Wildlife. The Montco Mine would temporarily destroy the existing wildlife habitat and deer travel lanes in areas being mined. The decades required for ponderosa pine/juniper revegetation and permanent loss of most of the breaks habitat would reduce deer cover. Additional hunting from population increase could cause a reduction of wildlife populations in the part of Custer National Forest near the mine and on private lands open to hunter access.

Climate. Climate would not be measurably affected by mining. Particulate and gaseous emissions would be neither sufficient nor emitted at high enough altitude to interfere with atmospheric processes.

Air Quality. During the year of maximum production and surface disturbance, year nine, total suspended particulate (TSP) concentrations near the permit area would increase significantly over premining levels. Federal secondary and Montana ambient air quality standards (AAQS) would probably be exceeded outside the permit area due to emissions from the mining operation and traffic on FAS 566. Violations caused by increased traffic on the county road (FAS 566) would be very localized.

Employment and Income. The Montco Mine would begin construction in 1985 and at full production would employ 560 persons. In Rosebud County, employment would thus become increasingly dominated by energy development; Powder River County employment would expand significantly. Neither Custer County nor the Northern Cheyenne Indian Reservation would experience significant indirect employment effects.

In the cumulative scenario, the dominance of energy employment in Rosebud County would be magnified. (The cumulative scenario assumes that four mines and one railroad connector would be built in addition to the Montco Mine and Tongue River Railroad mainline.) Powder River County would undergo the same sort of fundamental change in the employment pattern that has occurred in Rosebud County. Custer County would undergo a small increase in employment, mostly from the operation of the proposed Tongue River Railroad. The region as a whole would see coal mining replace agriculture by 1995 as the industry employing the most people.

Sociology. The population of the Ashland area is projected to increase 57 percent at most during construction of the Montco Mine and 91 percent, at peak, during the mine operation. The population of Rosebud County overall is projected to increase 8 percent during both mine construction and mine operation. Powder River County's population is projected to increase 37 percent at peak. Custer County would gain less than one percent.

Montco's development would slowly alter the social organization of the Ashland-Birney area by strengthening ties between these communities and the larger society, lowering the status of some individuals and groups while raising the status of others, diversifying the occupational structure and introducing new social values. The political process is likely to become more formal. The larger number of groups in the communities would make consensus more difficult. Without assistance the community is not likely to reach the consensus necessary to respond effectively to the demands of growth induced by the Montco Mine.

Community Services. The development of the Montco Mine would adversely affect the quality and strain the quantity of (1) Rosebud County's law enforcement system, health services, solid waste disposal system, and library facilities; (2) the Ashland-Birney area's schools; (3) Forsyth's general government and water storage facilities; (4) Powder River County's law enforcement system and health services; and (5) Broadus's general government, water storage, and public works staff. In addition, the housing supply of the Ashland vicinity of Powder River County, Broadus, Forsyth, Colstrip, and Ashland would be inadequate.

Fiscal. The State of Montana would receive most of the tax revenue generated by the development of the Montco Mine. Adverse fiscal impacts arising from the mine would fall on local government and school districts. The severity of these would vary both between jurisdictions and, over time, within jurisdictions. Two common types of fiscal problems would result: first, project-generated revenues would not be available to all affected jurisdictions. This would upset the fiscal balance of Powder River County, Broadus, Broadus's schools, Colstrip's schools, and Forsyth. Second, revenues generated would not be available during the years of project-induced expenditures. This would cause net revenue shortages for Rosebud County and the yet-to-be-built Ashland high school.

In the cumulative scenario, these problems would be aggravated. Expanded long-term permanent and peak temporary population influxes would require larger capital outlays, primarily in the mid-1980s, several years before any additional tax revenue would be available. Later, however, taxable valuations for most the jurisdictions affected by the Montco Mine would swell. Thus, during the 1990s and beyond, the property taxes would provide all essential funding.

Land Use. The proposed mine would not significantly affect the pattern of land uses in the region. The mine area would temporarily change from grazing to mining uses. The potential productivity of the reclaimed surface would be somewhat less than its current potential, but actual productivity could be greater.

Transportation. The most significant change in the transportation system resulting from the proposed mine would be the construction and operation of the proposed Tongue River Railroad. Increases in highway traffic, particularly in the cumulative scenario, would make improvements such as paving, widening, realigning, and bridge enhancement necessary on some road segments. The type and timing of improvements would depend on road condition and increases in traffic.

Recreation. Conflict between local residents and newcomers that arise from recreational activities, overuse of the Ashland Division of the National Forest, and crowding and shortages of recreational facilities would be the major impacts on recreation from the development of the Montco Mine.

Cultural Resources. Eleven prehistoric cultural sites eligible for listing in the National Register of Historic Places would be destroyed by the Montco Mine; however, all would be excavated, recorded, and analyzed prior to mining.

Aesthetics. The Montco Mine would replace the pastoral landscape of the mine plan area with an industrial setting.

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THE EIS: WHY AND HOW IT IS WRITTEN

WHO TAKES PART

WHAT DECISIONS MUST BE MADE

Montco proposes to build an open pit coal mine 6 miles south of Ashland, Montana, on the eastern edge of Rosebud County. Before beginning operations, Montco must obtain a surface mining permit from the Montana Department of State Lands, in accordance with the Montana Strip and Underground Mine Reclamation Act.

THE EIS

The Department of State Lands has determined that the proposed mining and reclamation plan may "significantly affect the quality of the human environment." Therefore, before making a decision on the company's permit, the Department has prepared an environmental impact statement (EIS) (Montana Environmental Policy Act [MEPA], 1971).

The EIS describes the company's proposal; the lands, people, and resources that the proposal would affect; and the impacts of the proposal. The EIS does not present the Department's decision. The document merely helps assure that the proposed operation is well planned and that the concerns of all are considered before a decision is made.

To date, as required by MEPA, the Department has--

(1) issued a draft EIS (in May 1982)
(2) encouraged and accepted public comments on the draft (until July 10, 1982)

With the publication of this final EIS, the Department has completed the EIS process. The Department must now make a decision on Montco's application. The decision can be made no sooner than 15 days following publication of this document.

This final document contains all the information in the draft, as well as the following:

(a) corrections or clarifications of the draft text.
(b) new information available since the draft.
(c) responses to each comment (both letters and testimony).

The changes since the draft stem in part from a revised, more readable format. More important changes stem from letters and testimony from the public. Much of the public comment called for two things: more information from the Department and changes in Montco's mining and reclamation plan.

The most noticeable difference between the draft and final is that this introduction has been added. The information here answers many of the general questions asked of the Department. Another difference is that chapter IV has been eliminated. The information formerly in that chapter has been distributed between the introduction and chapter III: all policy and regulatory information now appears in the introduction, all impact analysis in chapter III.

An additional change is the complete revision of chapter I. Here again, all regulatory and policy information was moved to the introduction. Chapter I now contains only a description of Montco's proposal, expanded for the final EIS to cover some topics not described in the draft.

Other changes in the document fall in chapters II and III, especially III. The analysis reexamines and, in some instances, takes a second look at those parts of Montco's plan questioned by the public. Meanwhile, the EIS has been updated, reflecting the passing of two years since the draft was published. An example of updating is the revision of employment and population figures to reflect today's circumstances. All changes in chapters II and III have been underlined or introduced with an underlined note. Readers familiar with the draft can speed their review by reading the underlined sections only.

The main addition to the final EIS is the transcript of all letters and testimony submitted by the public. In chapter V, all such public comment is reprinted, along with the Department's answers.

SCOPE OF ANALYSIS

The EIS analyzes both the immediate and cumulative effects of Montco's mining and reclamation plan. Included in the analysis are the impacts the mine would have on the physical environment--on soils, vegetation, water quality, air quality, and a number of other resources. Also included are impacts on the human environment--on land use, fiscal conditions, social conditions, and cultural resources. The text generally covers both the impacts directly from mining and those resulting from increases in employment and economic activity.

The EIS looks at two levels of mine development. Discussed in the greatest detail is Montco's North King unit (11-year) mine plan, for which the most information is available. Also discussed is the company's "life-of-mine" plan, a 24-year operation, and the 28-year "cumulative scenario."

The cumulative scenario was developed to show the impacts of the maximum growth projected. The scenario was prompted by the proposal to build a railroad along the Tongue River Valley, a railroad that must be built to ship coal from the mine. Once built, the railroad would probably bring additional coal mining to the area. Construction of the railroad itself and the mining it may stimulate are thus possible cumulative effects of the Montco Mine. The cumulative impacts from the coal development will be discussed in this EIS. The impacts of the railroad are addressed in an EIS by the U.S. Interstate Commerce Commission (Interstate Commerce Commission, 1983), the regulatory agency responsible for issuing the railroad's permit.

The cumulative scenario assumes that four mines and one railroad connector would be built in addition to the Montco Mine and the Tongue River Railroad. The construction of the first additional mine would begin in 1993. The construction of the last in 2003. The first additional mine would reach full production in 2003, the last in 2011. The four additional mines would be located in either Rosebud or Powder River Counties. (See Interstate Commerce Commission, 1983.)

Because Montco's plans for mining after year 11 are general, the discussion of impacts of the life-of-mine plan is also general. The decision on whether or not to write additional EISs should Montco apply for future permits, has not been made. A decision would be made if and when Montco submits future permit applications.

The analysis in the EIS is not a prediction of the future. Rather, it is a projection of what would happen if the mine opens and if certain "assumptions" about the future (the proposed plan, 24-year plan, or cumulative scenario) are correct. Note that the projections are based on the assumptions. An example of an assumption is the mine employment schedule contained in chapter III, Employment and Income. Another example is the amount of coal mined each year. The projections rely on the most up-to-date data available. But the future, as always, is uncertain.

Note that under many topics the EIS makes projections of future impacts not only with new mine development but also without it. That is, chapter II, Existing Environment, discusses what would happen to population, housing demand, taxes, and the like even without new mines. Chapter III, Impacts, goes on to say how the mines, including Montco, would change the no-new-mine level.

PREVIOUS DOCUMENTS AND RESEARCH

The EIS analysis draws data from many sources, each containing the most up-to-date information available. The sources are listed under Literature Cited at the end of the EIS. Some of these documents deserve special mention here.

Of primary importance to the EIS is Montco's application for a mining permit (Montco, 1983). The application, a 22-volume set, contains detailed, comprehensive data on most of the topics in the EIS. The data, collected over the last three to four years, range broadly, covering such topics as hydrology, soils, archeological sites, wildlife, and fisheries. Much of the information found in the EIS comes from exhaustive descriptions and species inventories in the application. For those interested, the application is available for review at the Department of State Lands, Helena and Billings, and at the Rosebud County Courthouse.

Since the permit application does not cover socioeconomic topics, the Department of State Lands contracted with Mountain West Research, a consulting firm, to perform a study on the social conditions and economy of the area surrounding the Montco Mine (Mountain West Research, 1981). The resulting 1,900-page report discusses Rosebud, Powder River, and Custer Counties, and includes the Northern Cheyenne Indian Reservation.

Much of the EIS's coverage of social sciences, such as taxes, schools, population, and housing, comes from the Mountain West report. For those interested, the report is available for review at the Department of State Lands, Helena. It is also available through the state interlibrary loan system, catalogued as "Proposed Montco Mine, Technical Report."

AGENCY RESPONSIBILITIES

A number of agencies have participated in the writing or review of the EIS and a number will participate in the issuance of permits necessary for a mining operation.

Montana Department of State Lands

The Department of State Lands (DSL) administers the Montana Strip and Underground Mine Reclamation Act (82-4-2 MCA), under which Montco has applied for a permit. The act provides for protection of environmental and cultural resources in and around the proposed mining area.

The strip mine act, passed in 1973, requires that a company intending to remove coal first obtain a permit from the Department of State Lands. In its permit application a company must submit a plan that meets all the requirements of the act. For instance, the plan must show that the company will salvage and replace all topsoil; restore the mined land to the approximate premining contour; plant a permanent and diverse cover of vegetation composed mainly of native species; protect alluvial valley floors; and preserve the hydrologic functions (such as subirrigation) of valleys.

Typically, after receipt of an application, the Department issues a "deficiency" letter. The letter points out to the company the parts of the mine plan that do not meet the law. The company then changes the plan. Through frequent meetings and the use of the deficiency letter (and often a second letter), the mine plan is continually improved. When the plan has adequately addressed all provisions of the law, Department makes its permit decision.

Office of Surface Mining

In 1977 Congress passed the Surface Mining Control and Reclamation Act (SMCRA), administered by the Office of Surface Mining. The act contains many of the same provisions contained in the Montana Strip and Underground Mine Reclamation Act. As a result, the Department of State Lands developed a "permanent regulatory program" to comply with both acts. OSM then delegated to the Department much of the federal responsibility for regulating mining in Montana, approving Montana's permanent program on April 1, 1980, as the body of law for compliance with SMCRA.

The Department of State Lands is the agency regulating coal mining in Montana. Even so, OSM oversees the Department's work to be sure program standards are met. OSM also sometimes collaborates with the Department in the writing of EISs and must, along with the Department, approve a company's plan before mining operations begin. For the Montco Mine, OSM has prepared a separate EIS (OSM, 1983), now a draft document.

As part of writing an EIS, OSM must request a list from the U.S. Fish and Wildlife Service of the threatened and endangered species that may be present in the mine area. OSM must then write a biological assessment describing the project's effects on the listed species.

Montana Department of Health and Environmental Sciences

Montco has applied to the Air Quality Bureau of the Department of Health and Environmental Sciences for an air quality permit which is necessary before the company can begin operations. Prior to receiving the air quality permit, Montco must demonstrate that mining would not violate either the Montana or Federal Clean Air Act.

Montco must also file with the Water Quality Bureau for a Montana Pollutant Discharge Elimination System (MPDES) permit. The permit would cover surface water discharges from pits and ponds and sanitary wastewater discharges from the entire mine. Discharges have to meet effluent limitations and water quality standards established by the Montana Board of Health and Environmental Sciences.

State Historic Preservation Office

The State Historic Preservation Office has the responsibility to cooperate with and advise the Department of State Lands when potentially valuable historical, archaeological, or other cultural resources are located in a project area (Montana Strip and Underground Mine Reclamation Act [MCA 82-4-201 through 82-4-228], the Montana Antiquities Act [MCA 22-3-401 through 22-3-442], and the National Historical Preservation Act [P.L. 89-665 as amended and reauthorized E.O. 11593]). The office seeks a determination from the Keeper of the National Register for sites believed to be eligible for listing on the National Register of Historic Places. The office may comment on a company's plan for impact mitigation of sites eligible for nomination to the National Register of Historic Places. The office also reviews the EIS to ensure compliance with cultural resource regulations. During mine operation, the Department of State Lands is responsible for monitoring compliance with historic preservation and monitoring plans.

ADMINISTRATIVE ALTERNATIVES

After evaluation of the EIS and Montco's mine application, the Department of State Lands may take one of the following four administrative alternatives.

1. Approve the Permit as Proposed

The environmental effects of approving mining and reclamation plan as proposed are contained in chapter III.

2. Deny the Permit

The Department may reject a proposed plan that does not meet Montana's permanent regulatory program (ARM 26.4.301 et seq.). The effects of denying the permit would be that the physical environment of the mine plan area would remain as described in chapter II.

3. Selectively Deny the Permit

The Department can deny the permit to mine in a specified area where reclamation consistent with the permanent program is not possible. The specified areas would include, for example, those having special, exceptional, critical, or unique characteristics, or where mining would affect the use, enjoyment, or fundamental character of neighboring land having the above special characteristics (82-4-227 MCA). The impact analysis in the EIS has not disclosed any such lands, but that does not preclude such action following review of the EIS.

4. Approve the Permit with Stipulations

If parts of the proposed plan were considered unacceptable, the Department could grant the permit with stipulations. Possible stipulations would include any modifications to the proposed plan considered necessary to meet the requirements of State law.

Modifications identified in this EIS that would reduce the impacts of the mine are listed as separate sections at the end of each subject in chapter III. These sections are titled "Mitigating Measures." Not until the granting of the permit would it be known which, if any, mitigating measures would be attached to the permit as stipulations.

Any of these alternatives could be chosen to reduce the impacts of Montco's mining and reclamation plan or to comply with legal requirements. Although the Department considers Montco's 11-year plan when reviewing the permit application, the company still has to renew the permit at the end of 5 years (and 10 and so on) even if the mining plans do not change.

TECHNICAL AND ENERGY ALTERNATIVES

Technical Alternatives

Alternative ways of mining the coal at the Montco Mine exist but are either impractical or inferior to the proposed truck-and-shovel strip-mining operation proposed by Montco. As a result, no alternative mining methods have been analyzed in detail in this EIS. Alternative mining methods considered but ruled out include auger mining, underground mining, and dragline mining.

Although practiced in nearby mines, dragline mining would have two drawbacks at the Montco Mine. First, operating the dragline efficiently would be difficult because in places the topography is rolling and dissected and the depth of the coal seams variable. This is especially so in the life-of-mine area. Second, the dragline cannot selectively handle overburden in the way proposed by Montco. That is, Montco's plan of separately storing the favorable overburden--to promote plant growth during reclamation--would be difficult or impossible using a dragline.

Underground mining has several disadvantages. Although an underground method would not disturb the soil and rock strata overlying the coal, the land surface could subside after mining, as the underground mine workings collapsed. The resulting depressions and holes would limit land use for livestock grazing. A further problem might be underground coal fires, which can start when unextracted coal is exposed to air. Such fires can burn for years, despite repeated efforts to extinguish them.

Auger mining could be used in conjunction with strip mining to recover additional coal in highwalls and along outcrops. In highwalls, for example, the auger could bore into the coal seams beyond the economic limit of overburden removal for coal stripping. Auger mining, in this case, would not replace strip mining, but would be used as a minor supplement to the strip-mining methods already proposed.

Energy Alternatives

Coal holds an important place in a broad mix of fuel sources. The need for coal is not expected to be replaced. In the 1970s, many natural gas-and oil-burning units were converted to coal in a national move toward energy independence. Recently, electricity generation from nuclear power has not increased as rapidly as once predicted, slowed by high capital costs and uncertainty over safety. A diminishing number of sites for hydroelectric power generation limits the addition of new sites. Likewise, geothermal power sources are limited, and it is unlikely that geothermal power will be able to provide electric power in the large volumes supplied by coal-fired plants. Solar power (active, passive, biomass) is not likely to replace coal-fired electric plants soon.

IN-8 / Technical and Energy Alternatives

The debate over energy sources is complex and is of a national scale. Alternative sources of energy have been discussed in detail in the handbook "Energy Alternatives," a comparative analysis published in 1975 by a number of federal agencies. The issue has also been discussed in the Department of the Interior's environmental Impact Statement on Federal Coal Management Program (U.S. Department of the Interior, 1978). For more information, the reader should refer to these documents.

Chapter I

DESCRIPTION OF MONTCO'S PROPOSAL

Montco, a Montana partnership of Thermal Energy Inc. and Tongue River Resources Inc., proposes to open a coal strip mine in the Tongue River Valley in Rosebud County, Montana (fig. I-1). The mine would produce 186.1 million tons of coal over 24 years at a maximum rate of 12 million tons per year.

The 24-year mine plan area covers 10,171 acres: 5,322 for mining, roads, soil and overburden stockpiles, and other disturbances; 218 for facilities disturbance; and 4,631 for unplanned associated disturbance. Within the 24-year area are five mining units and a facilities area (fig. I-1). Only the facilities area and the North King mining unit are included in Montco's current permit application. Montco has not yet submitted detailed mining plans for the other units, but would have to do so when applying for future permits.

MINING METHODS

Mining would begin (fig. I-2) after scrapers remove the soil. Topsoil would be taken first, subsoil second, and each would be kept separated. Explosives would then be used to break up the overburden (rock strata over the coal), which would be loaded by electric-powered shovels and hauled away by trucks. All mine disturbance would stay at least 100 feet from the property next to the mine. (This excludes the property included in the 24-year mine plan area. Montco would be able to work within 5 feet of the 24-year area, owing to a waiver granted by the Department of State Lands.)

Soil and overburden would sometimes be hauled to stockpiles. When possible, however, stockpiling would be avoided: Both soil and overburden would be removed and relaced by "direct haul." That is, scrapers or trucks would take freshly stripped material and spread it directly on areas being reclaimed.

After soil and overburden stripping, shovels would excavate the coal. Bottom-dump coal-haulers would haul the coal to a truck dump, where the coal would be crushed by a primary crusher. An overland conveyor would in turn carry the coal to a secondary crusher in the facilities area (fig. I-1). As the mine grows, the conveyor would be extended to the south to each new mining unit. At the edge of each new unit, Montco would build a new dump station.

After coal removal, trucks would dump excavated overburden (spoil) back into the empty pit. After the pit is filled, the land surface would be graded to closely match today's unmined topography. Scrapers would then spread subsoil, followed by topsoil, and the land would be seeded.

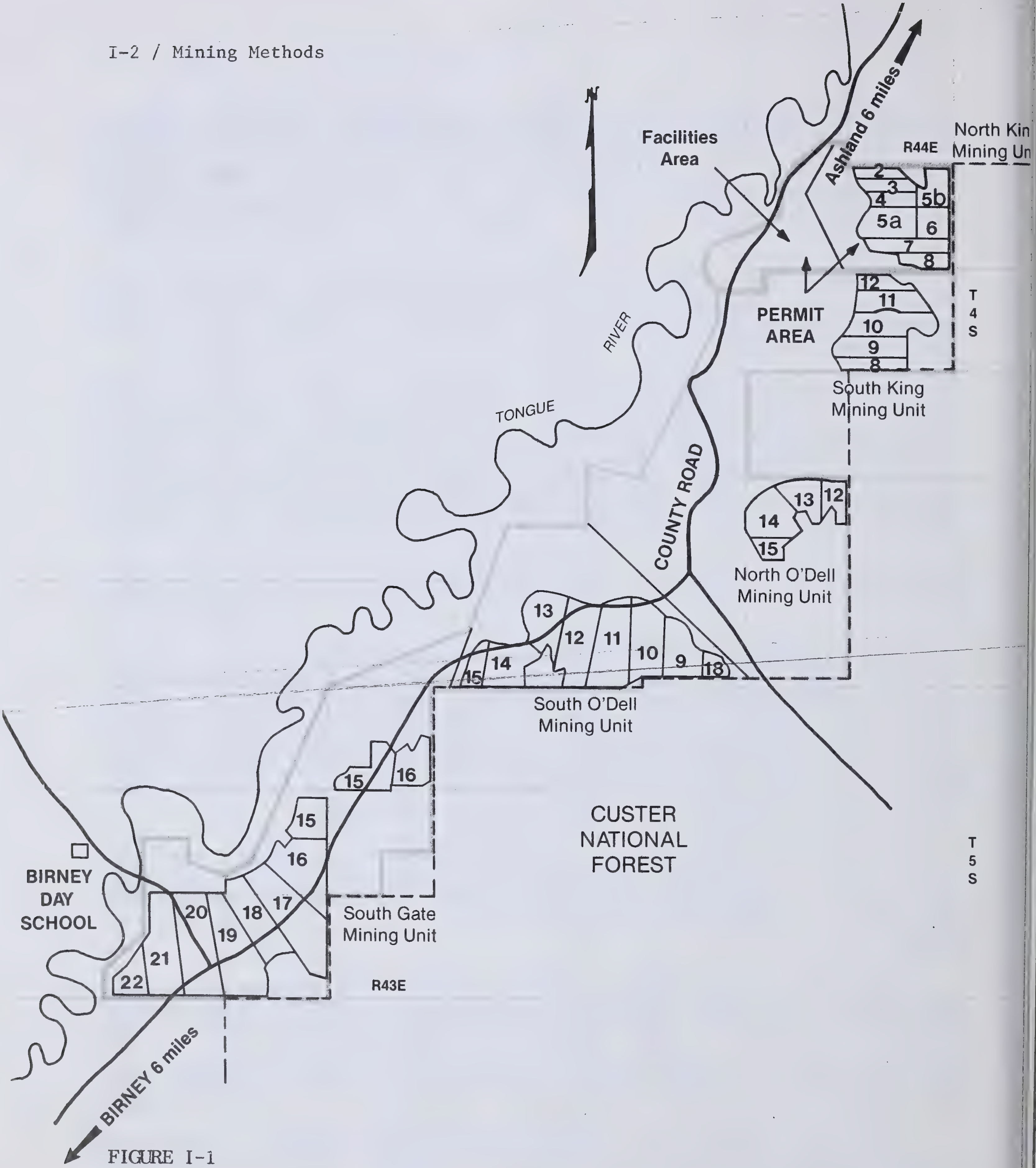


FIGURE I-1

Montco 24-year Mine Plan Area and Permit Area. The Current Permit Application Covers Only the Facilities Area and the North King Mining Unit. Numbers Indicate the Areas to be Mined Each Year.

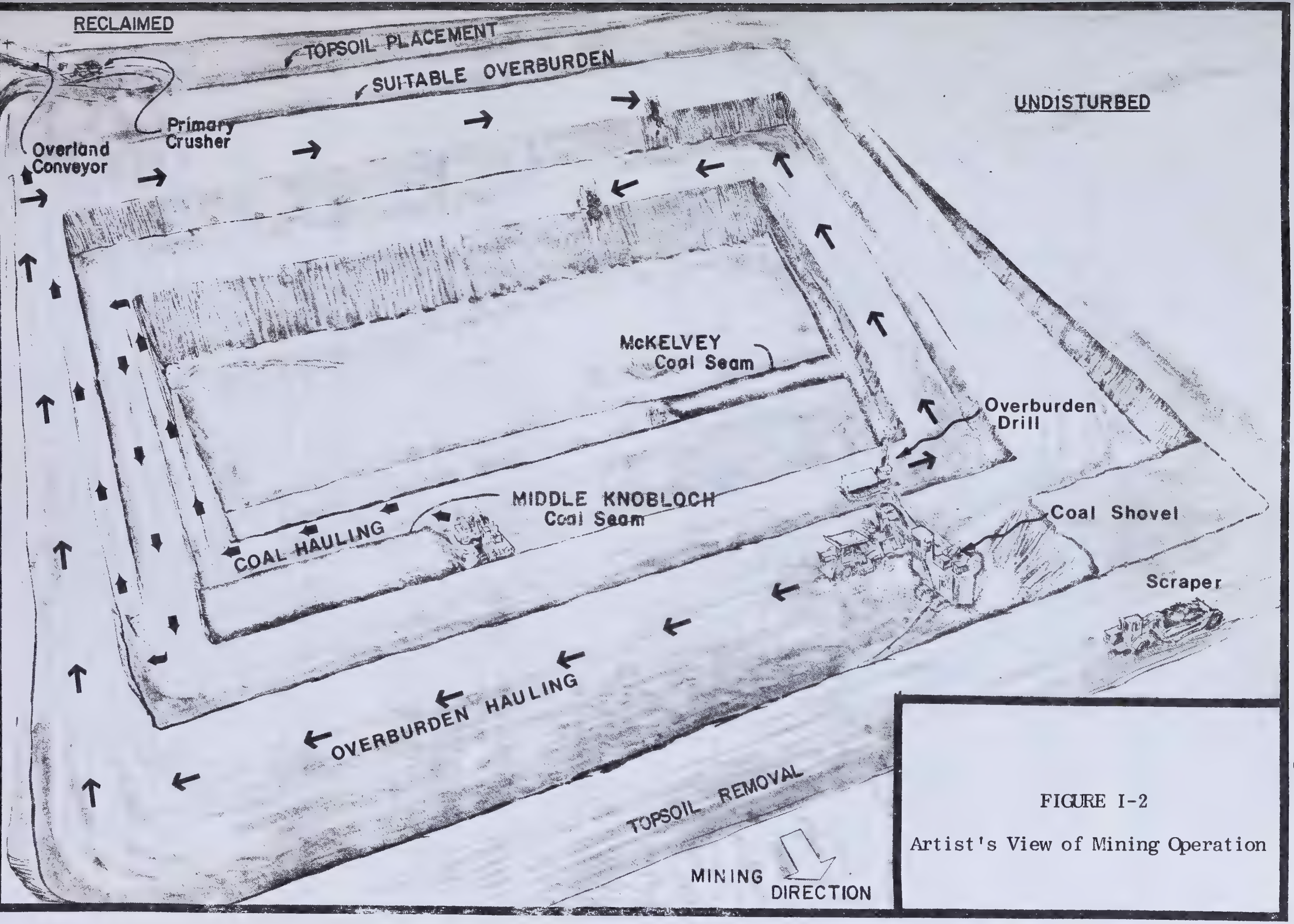


FIGURE I-2

Artist's View of Mining Operation

MINE FACILITIES

From the secondary crusher in the facilities area, a conveyor would carry coal to either the train loadout, for loading into unit trains, or to the storage building. When needed, stored coal would be run back to the train loadout.

Included in the facilities area for the life of the mine would be the rail loop; the soil stockpiles; the conveyor and truck dump; roads FAR1, FAR2, FAR3 and FAR4; the haul roads to the pit and topsoil stockpiles, the rancher access road to the center of the rail loop; maintenance and employee facilities; and the shop and office complex (fig. I-3). Some time during mine operation, Montco would build another small maintenance and employee facility to support operations in the last two (southernmost) mining units.

Montco's plans call for some construction outside the facilities area. The main project would be the building of a 69-kilovolt powerline from Ashland to the facilities area. The route of the line would be chosen by the Tongue River Electric Cooperative. Another project would be the relocation of a number of miles of the county road, moved one section at a time as the mine expands. The first road relocation would make room for the facilities area (fig. I-1). The road would be constructed to county specifications as required.

TONGUE RIVER RAILROAD

Shipping coal from the mine would require a railroad. Accordingly, the Tongue River Railroad Company proposes to build a main line to the proposed permit area. Montco would build a 3.7-mile spur and loop, 2.8 miles of which would lie beside the Tongue River Railroad tracks and within the Tongue River Railroad corridor. The part of the Tongue River Railroad serving the mine would be completed in 1987; a connector to a second terminal point, Otter Creek, would be completed in 1989 (Interstate Commerce Commission, 1983, p. 3-4).

The Tongue River Railroad Company may eventually extend the main line south of the mine. Montco would implement one of the two following plans, depending on whether or not the line is extended.

Plan 1: The Tongue River Railroad is extended through the permit area during the life of the Montco Mine.

If the railroad is extended through the permit area, Montco would apply for bond release on the part of the main line corridor east of the Montco siding and loop. Later, when the mining is completed, Montco would remove its track and ties from the western part of the main line corridor and apply for bond release on that area. Because the main line would remain after mining, Montco proposes that stabilized cuts and fills not be redisturbed after mining ends. Instead, Montco would request bond

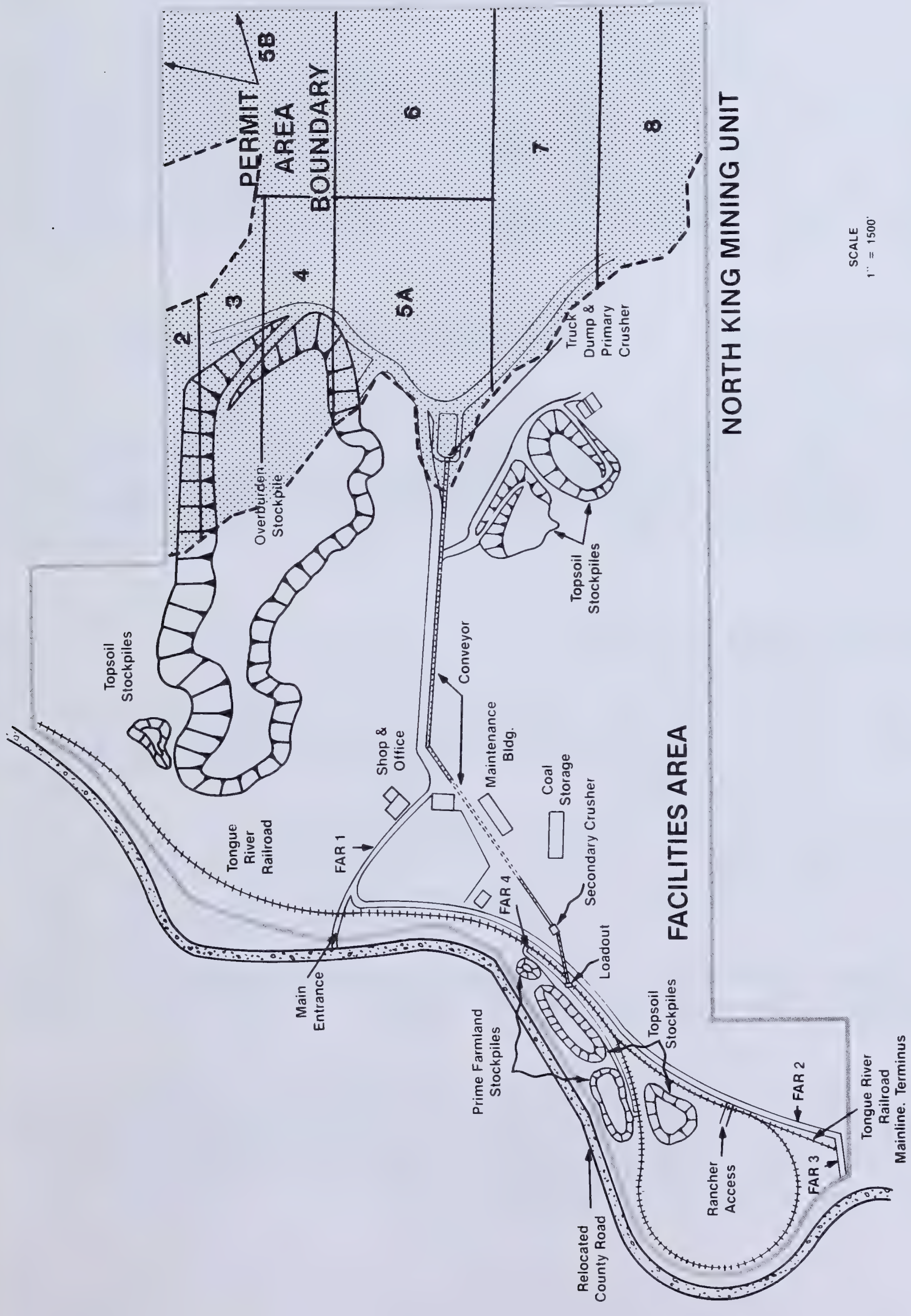


FIGURE I-3

Permit Area Mine Plan

release on the corridor under the alternative reclamation provisions of the regulations governing mining. Final reclamation of the main line would be regulated by the Interstate Commerce Commission.

Plan 2: The Tongue River Railroad does not extend through the permit area during the life of the Montco Mine.

Montco would remove the tracks and ties for its siding and loop and convert the corridor to a road suitable for county use. This would allow the road that was relocated during mining to be moved back into the transportation corridor during reclamation. Montco would apply for bond release under the alternative reclamation provisions of the regulations governing mining.

NORTH KING MINING UNIT

The permit area has two parts: the facilities area and the North King mining unit. The estimated life of the facilities area is 22 years (excluding 2 years for reclamation), that of the North King mining unit, 11 years. A total of 1,274 acres are included in the permit area (table I-1), of which 671 would be disturbed (table I-2).

TABLE I-1

Area Affected by Permit Application

Disturbance	Bonding Level	Acres
Mining (North King Mining Unit)	Mining	502
Facilities	Facilities*	128
Transportation Corridor	Facilities*	41
Remainder of Permit Area (minor disturbances only)	Associated	603
Permit Area Total		1,274

Source: Montco, 1983.
*To remain bonded throughout the life of the mine.

Coal production in the North King unit would begin in year 3, peak at 6 million tons per year in year 6, and end after a total yield of 25 million tons. The unit would be reclaimed beginning in year 7, ending in year 11. Mining would continue in the South King unit, starting in year 9, if Montco receives a permit to mine in the new area.

TABLE I-2

Disturbance and Coal Production
from the North King Mining Unit and Facilities Area

Year	Coal Production (Millions of Tons)	Facilities (acres)	Mining (acres)	Reclamation (acres)
1 & 2	0	169	70	0
3	1	0	47	0
4	2	0	58	0
5	4	0	136	0
6	6	0	66	0
7	6	0	65	149.8
8	6	0	54	123.6
9	0	0	6	21.3
10	0	0	0	191.4
11	0	0	0	33.5
22-24	0	0	0	110.4
Total	25	169	502	630*

Source: Lanny Icenogle, Montco, written commun., January 9, 1983.
*The 41-acre transportation corridor would be permanent. As a result, total reclamation would be 630 acres (128 + 502) rather than 671 acres (169 + 502).

Department of State Lands regulations require that all runoff from the mine be passed through sediment ponds before leaving the permit area. Accordingly, Montco would build a system of ditches, dams and ponds to capture, divert, and retain all runoff from the mine area (fig. I-4). The ponds, numbering 16 in the North King unit, would trap and retain sediment washing from bare soil and overburden. The water would be released after sediment settles out--not sooner than 24 hours after the runoff enters the ponds.

Mining would begin in the northwest corner of section 9 T4S, R44E (fig. I-1) and would move south. Before pit excavation, Montco would mark with stakes the depth and thickness of the overburden that is favorable for plant growth--that is, the material, when placed in the rootzone, that would not inhibit plant establishment. All such overburden would be excavated separately and segregated at the west end of the overburden stockpile, where the material would remain until reclamation. The overburden stakes would be placed as indicated on maps developed by Montco during studies of samples from overburden drill holes.

Backfilling the pit (replacing the spoil) would begin in year 4. The area backfilled during years 4 and 5 would be used for overburden stockpiling. In years 4 through 7, the company would backhaul some overburden directly and

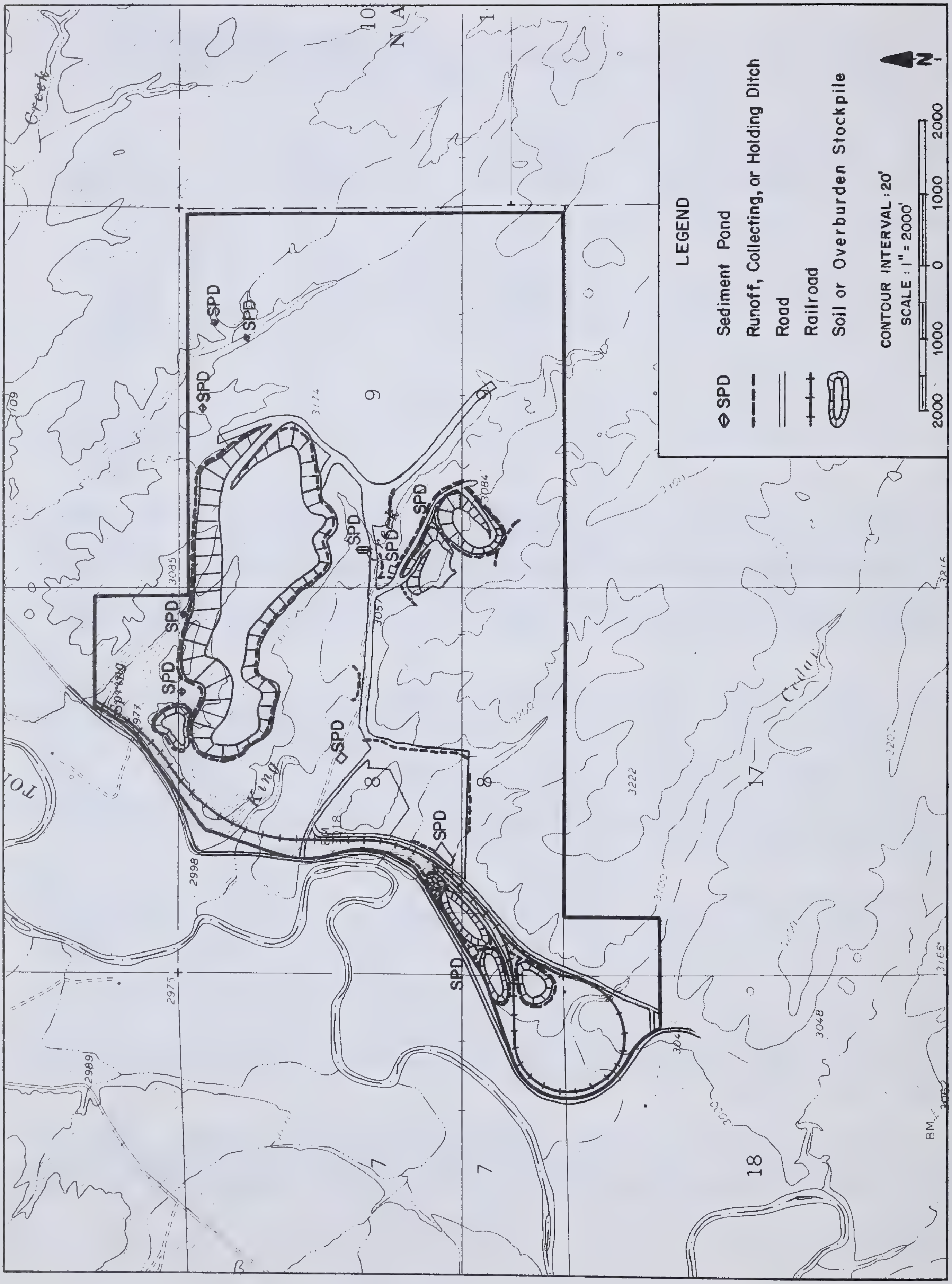


FIGURE I-4

Location of Drainage Control Ditches and Sediment Ponds stockpile the excess. In year 8, all overburden would be hauled directly to the pit. The North King pit would be filled by year 10, when the company would haul all overburden from stockpiles. The land would then be graded into slopes of generally less than 20 percent with topography closely matching what exists today.

Montco would spread the backfilled surface with at least 8 feet of the favorable overburden. The company would then take samples for analysis to double-check overburden quality. Backfill that tests unfavorable for placement in the rootzone would be buried elsewhere and replaced.

After grading, scrapers would respread about 18 inches of soil. In the area proposed for hayland, the soil depth would reach as much as 48 inches. Seeding and planting of the backfilled area would start in year 7 and continue through year 11. Reclamation of roads, stockpiles, and other disturbances in the North King unit would end in year 11.

Fifteen ponds would remain on the reclaimed land after mining. These would trap the sediment eroding from the unvegetated landscape. Once plant cover becomes established, and after the Department of State Lands determines that reclamation is successful, all but one sediment pond would be removed. Montco would then return the land to today's land uses--livestock grazing and wildlife habitat--for which the one sediment pond built in section 9 would serve for stock watering.

The mine plan for the North King unit would employ 280 permanent workers. The mine would operate 2 shifts per day, 7 days a week, 340 days per year.

COAL IN THE NORTH KING MINING UNIT

Montco plans to mine the two major coal seams that underlie the North King mining unit, the Middle Knobloch (MK) and the McKelvey (MLV) (table I-3). The McKelvey splits into two seams, the MLV, and ML1, in the southern part of the unit. Three local seams, the LF1, LF2 and LF3, and another seam 350 to 400 feet deep, would not be mined because of their depth, thinness, and limited area. (See chapter II, Geology.)

All coal Montco would mine in the permit area is leased from Burlington Northern Inc. The coal to be mined in the rest of the 24-year mine plan area would be leased from the state of Montana or from companies or individuals. Within and next to the 24-year mine plan area there are an additional 130 million tons of unleased, recoverable Federal coal. The Federal coal lies under 2,500 acres of private and Federal surface. Figure I-5 shows coal ownership within the proposed permit area; figure I-6 shows surface ownership.

About 71 percent of the coal in the North King unit would be recovered. Of the 29 percent not recovered, 4 percent is uneconomic; 10 percent would be lost to waste and spillage; 9.5 percent would be lost under the highwall; and 5.5 percent would be lost due to regulatory constraints, such as buffer zones along boundaries.

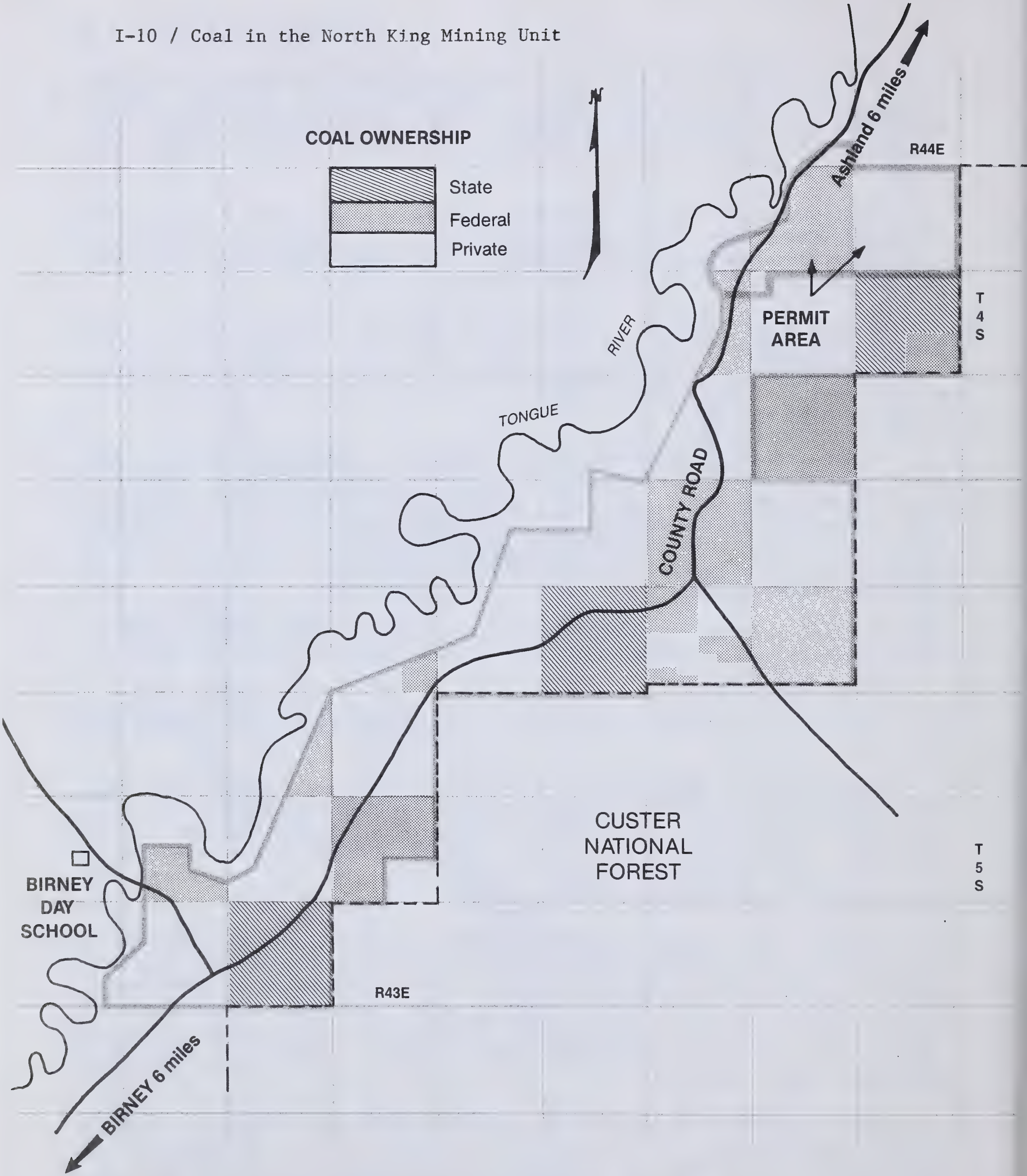


FIGURE I-5

Coal Ownership in the Proposed Mine Plan Area

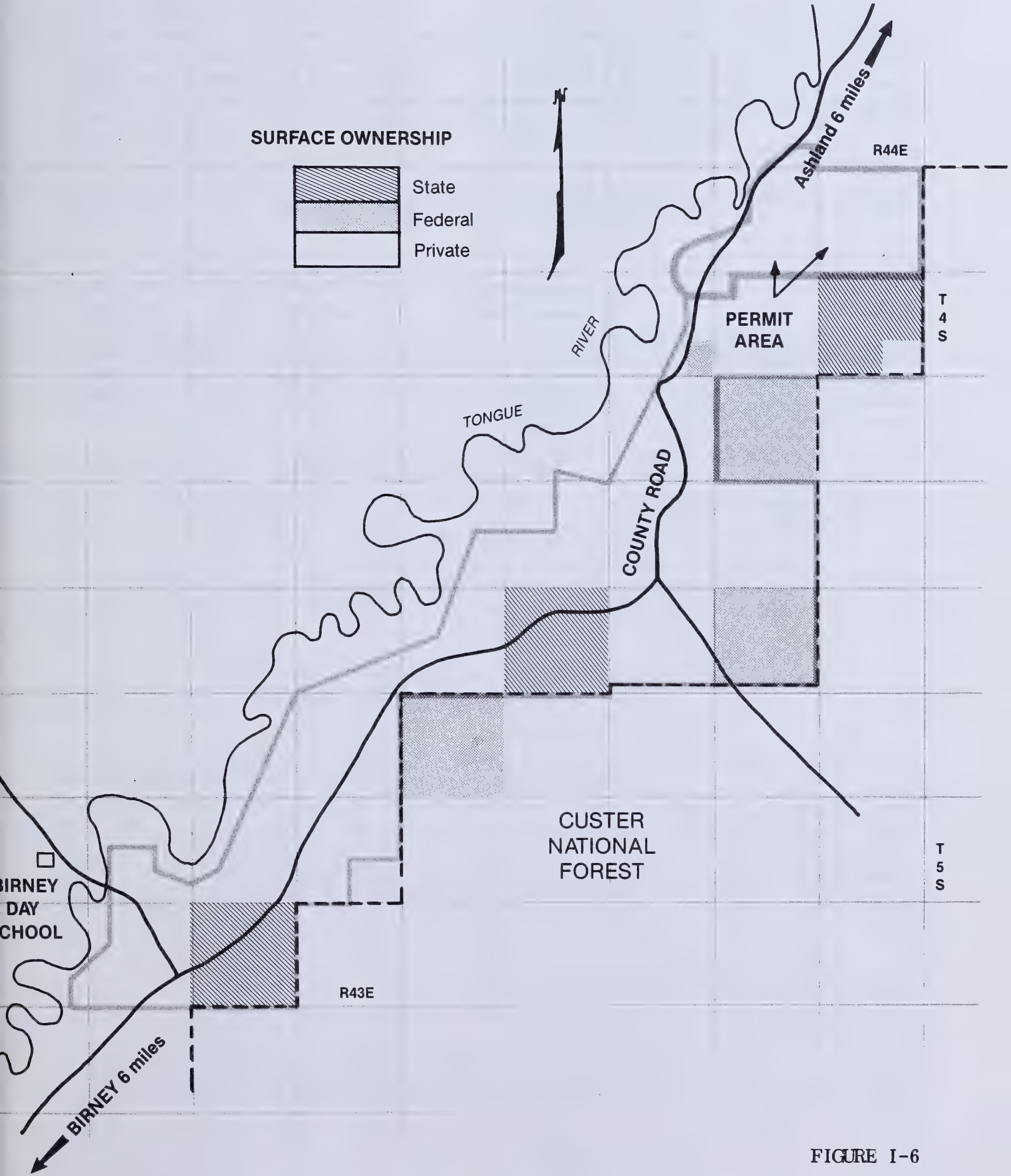


FIGURE I-6

Surface Ownership in the Proposed Mine Plan Area

The coal mined in the North King unit would average, at the loadout, 8,655 BTU, 27 percent moisture, 6.98 percent ash, and 0.34 percent sulfur. This is typical of Northern Powder River Basin coal and suitable for use in coal-fired electric generating plants. The company's coal marketing efforts focus on utilities in the upper Midwest and the Pacific Northwest.

TABLE I-3

Coal in the North King Mining Unit

Seam	Average Thickness (feet)	Total Reserves (Thousands of Tons)	Mineable Reserves
Middle Knobloch (MK)	44.0	23,942	17,520
McKelvey (ML1)	8.6	1,000	840
McKelvey (MLV)	16.0	10,000	6,320
Local (LF1)	1.7	1,142	850
	Total	36,084	25,530

Source: Montco, 1983

DESCRIPTION OF THE EXISTING ENVIRONMENT

An analysis of Montco's mining and reclamation plan requires that the EIS cover 17 subjects, representing the "environment" of the minesite. This environment encompasses the resources, enterprises, services, facilities, and people that could be affected by the project. This chapter presents the condition of the minesite environment today. The reader is reminded that all changes made since the draft EIS have been underlined.

GEOLOGY

Summary: Numerous geologic studies of the region have been undertaken, and additional geologic data have been supplied by Montco. The topography of Montco's entire mine plan area is one of a rolling, moderately-dissected bench, bounded on the east by uplands of Custer National Forest and on the west by the Tongue River. Ephemeral tributary streams to the Tongue River traverse the North King mining unit.

All coal resources of interest to Montco are within the Fort Union Formation, which underlies the entire mine plan area. No significant structural features are believed to be present. All coal is classified as subbituminous C.

Overburden chemical and physical properties vary widely throughout the mine plan area.

The proposed Montco Mine is located in the Northern Powder River Coal Basin of southeastern Montana and northeastern Wyoming. The geology of this region has been discussed in a previous environmental impact statement, DES 79-41 (U.S. Department of the Interior and Montana Department of State Lands, 1979). Earlier geologic work in the area has been reported by Warren (1959), Gilmour and Williams (1969), and Matson and Blumer (1973). Additional geologic information on the area has been submitted by Montco in its permit application.

Topography and Geomorphology

North King Mining Unit

Montco's proposed permit area lies in the North King mining unit. The North King unit lies north of King Creek, which is an incised, ephemeral tributary to the Tongue River (fig. II-1). Associated topsoil stockpiles and mining facilities are located south of King Creek and along the Tongue River. The North King unit lies on a bench above both the Tongue River and its associated terraces to the northwest, and below uplands of Custer National Forest to the east. The bench is moderately dissected and drained by ephemeral tributaries of King Creek and the Tongue River. Topographic relief of the North King unit is about 200 feet.

Visual observations suggest that erosion is probably moderate to moderately severe over the North King unit. Vegetation cover is sparse, and pedestalling of grasses was observed in the field. Surface runoff from normal rainfall and snowmelt erodes bare soil and intermittently transports it toward ephemeral channels draining the area. Bedrock outcrops are common within the North King unit, and limit soil erosion due to surface runoff. Dominant erosion processes probably active on hillslopes and interfluves in the area include wind, rainsplash, and sheet and rill wash. Gully formation and headcutting in the ephemeral channelways are locally active; however, bedrock outcrops appear to limit these latter erosional processes.

Mine Plan Area

The 24-year mine plan area stretches approximately 12 miles southwestward from the North King unit along the eastern margin of the Tongue River to just south of Birney Day Village on the Northern Cheyenne Indian Reservation (fig. II-2). The project area is over four miles wide at its widest point, and averages about two to three miles in width.

Numerous ephemeral streams traverse the area from the southeast to the northwest and are tributaries to the Tongue River. Topography of the mine plan area is similar to that of the North King unit. The major zones of economic coal deposits underlie a bench between the Tongue River and associated terraces and uplands of Custer National Forest. Maximum topographic relief within the mine plan area is approximately 600 feet.

Stratigraphy and Structure

The entire mine plan area is underlain by the Tongue River Member of the Fort Union Formation, which contains all coal seams of economic importance in this area. The Tongue River Member is composed mainly of variegated mudstone, shale or claystone, and interbedded sandstone layers. Underlying the Tongue River Member are several additional stratigraphic units of the Fort Union Formation, the Lebo Shale, and Tullock Members. Beneath the Fort Union Formation lies the late Cretaceous Hell Creek Formation. This latter formation is recognized as a reliable aquifer in the region and probably supplies several of the most productive deep water wells within the Tongue River Valley.

Five major coal seams lie within the project area, all within several hundred feet of the surface. They are, in descending order--

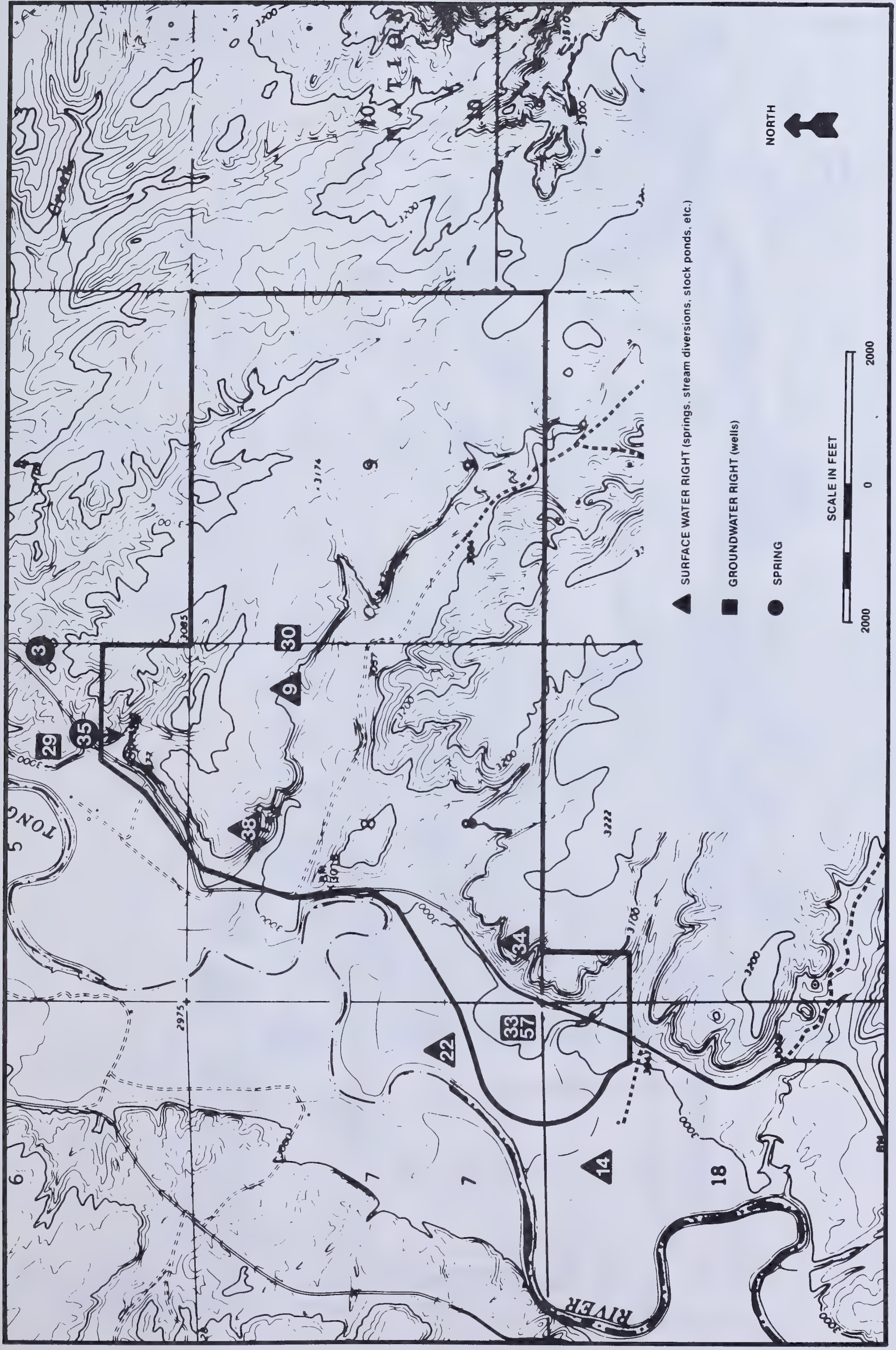

SURFACE WATER RIGHT (springs, stream diversions, stock ponds, etc.)
GROUNDWATER RIGHT (wells)
SPRING
SCALE IN FEET
2000
0
2000
NORTH
TONGUE
RIVER
3
35
29
30
9
38
34
33
57
22
14
18
7
8
6
5

FIGURE II-1--Water Rights in the Permit Area

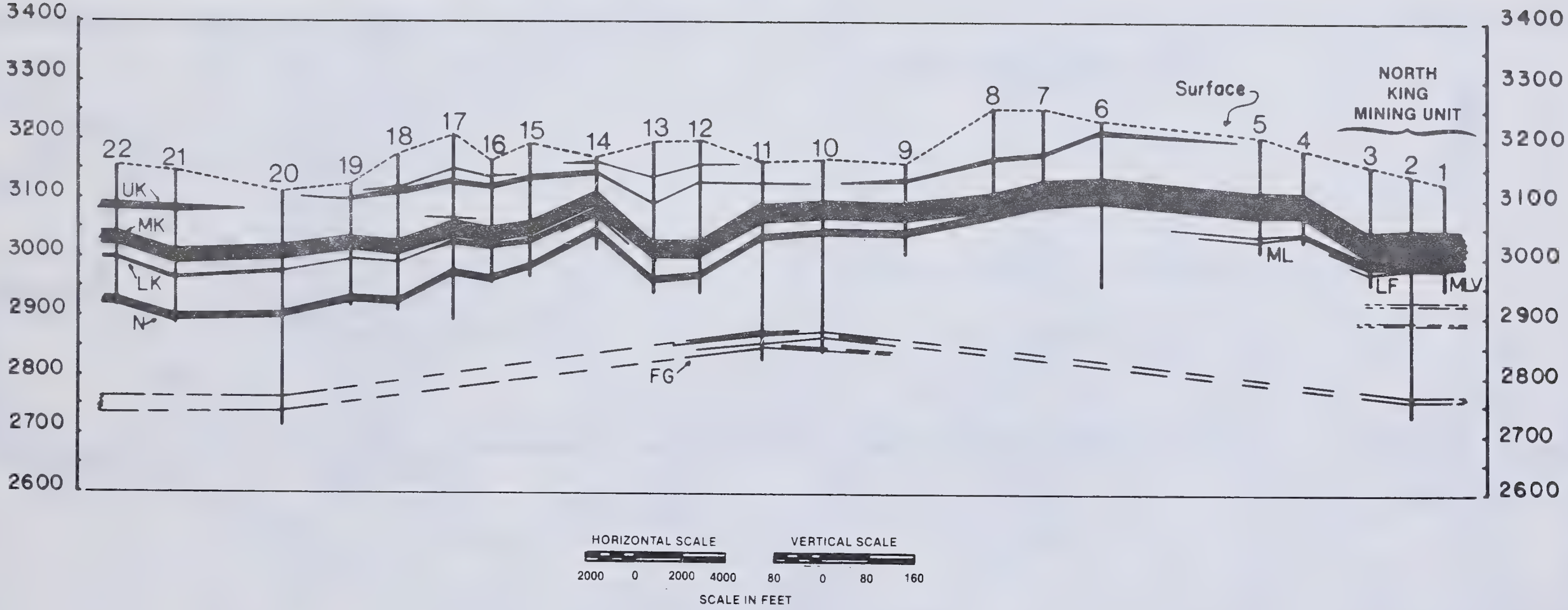
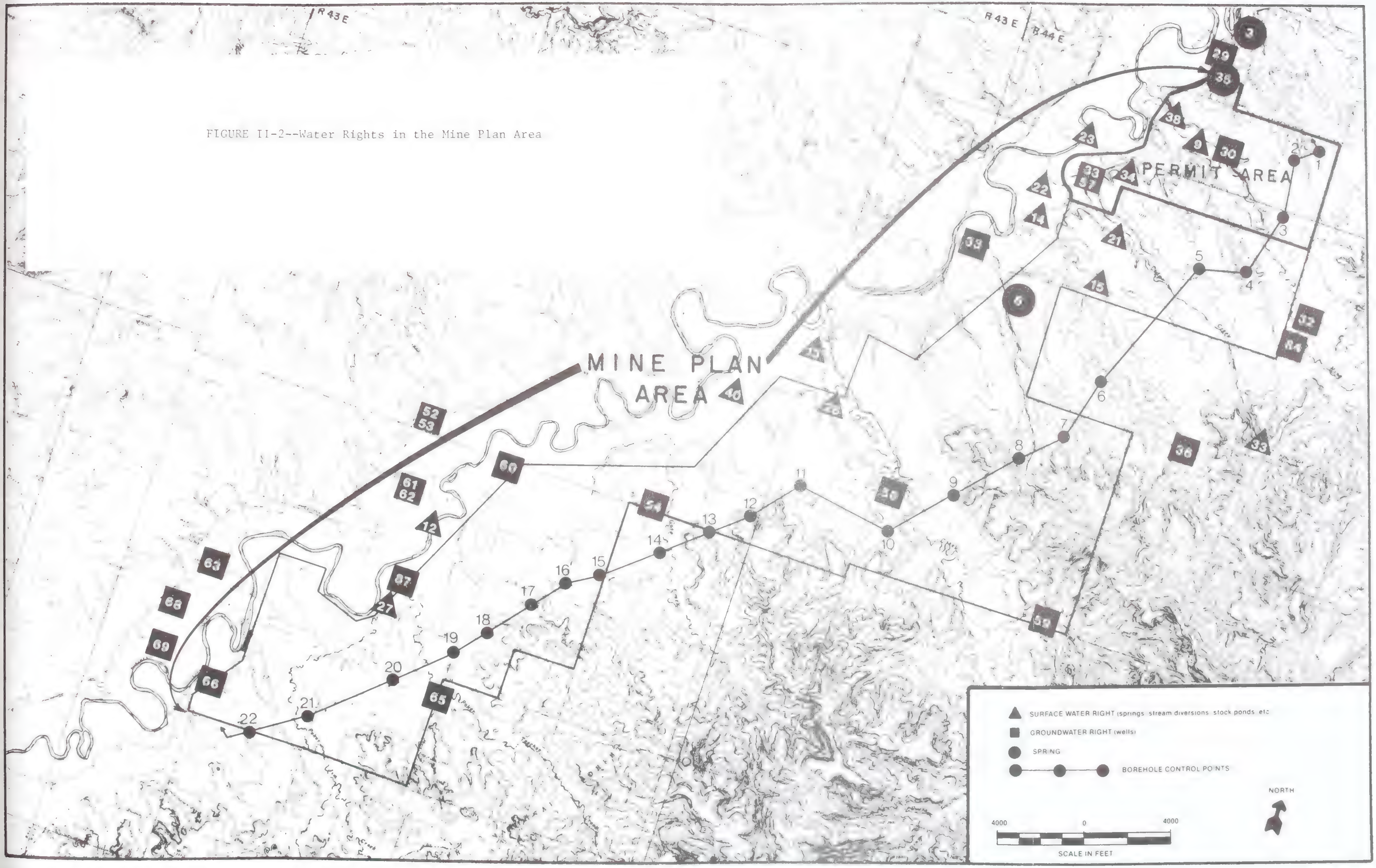


FIGURE II-3--Geologic Cross Section of the Mine Plan Area
(The location of the cross section is shown on Figure II-2.)

UK-Upper Knobloch
MK-Middle Knobloch
LK-Lower Knobloch
N-Nance

FG-Flowers-Goodale Bed
ML-Local Beds that Coalesce to form McKelvey
MLV-McKelvey
LF-Local Beds above Flowers-Goodale

FIGURE II-2--Water Rights in the Mine Plan Area



Upper Knobloch
Middle Knobloch
Lower Knobloch
McKelvey
Nance

Numerous thin stringers of coal are also present, but they are typically unnamed, discontinuous, and economically insignificant. Only the Middle Knobloch seam is continuous throughout the mine plan area (fig. II-3).

No major structural features lie within the mine plan area. Bedrock units lie nearly flat, and no major faulting has been confirmed by field evidence. Linear features have been observed, particularly near O'Dell Creek; however, their significance is probably minor.

Within the North King unit, only the Middle Knobloch, McKelvey, and LFI seams are present and targeted for mining (fig. II-3). Both the Middle Knobloch and McKelvey coal seams gently dip to the northeast in the unit.

Coal Resources

Information supplied by Montco indicates that about 36.1 million tons of mineable coal reserves underlie the North King unit, as part of two major and one minor coal seam: the Middle Knobloch (MK), the McKelvey (MLV), and the Local Flowers 1 (LF1) (fig. II-3). The McKelvey seam splits to the south to form the MLV and the ML1. All of these seams are mineable by current surface mining techniques. Table I-3 indicates average coal seam thickness and estimated resources within the unit. Table II-1 provides selected coal quality values for the four seams to be mined. The coal to be mined is classified as low sulfur, subbituminous C.

TABLE II-1

Coal Quality as Received at Loadout for the North King Mining Unit

	Coal Seam			
Measure	MK	ML1	MLV	LF1
BTU	8755	8437	8437	8437
Percent moisture	27.13	26.87	26.87	26.87
Percent ash	5.65	9.88	9.88	9.88
Percent sulfur	0.31	0.40	0.40	0.40

Within Montco's mine plan area (fig. II-2), all coal seams above and including the Nance seam would be mined (fig. II-3). The Middle Knobloch is the only coal seam known to be continuous within Montco's entire mine plan area and is the primary target of mining. The other major coal seams listed above are present in one or more mining units and would be mined where present.

Table II-2 indicates the amount of private and State coal present in Montco's mine plan area. The average coal quality of each seam within the mine plan area is shown in table II-3. All coal proposed to be mined is classified as subbituminous C.

TABLE II-2

Montco's Mine Plan Area Coal Resources

Mining Unit/ Area	Estimated In-Place Resource* (MMT)	Losses (MMT)	Net Mineable Reserves (MMT)
North King	36.1	10.6	25.5
South King	24.5	3.1	21.4
North O'Dell	19.5	2.5	17.0
South O'Dell	41.2	5.2	36.0
South Gate	48.7	12.5	86.2
TOTAL	220.0	33.9	186.1

*Estimate based on specific gravity of 1.34 = approximately 1,821 tons per acre-foot.

TABLE II-3

Average as Received Coal Quality

Seam	Percent Moisture	BTU	Ash	Sulfur
Upper Knobloch	25.06	8786	7.12	1.02
Middle Knobloch	24.12	9195	5.33	0.32
McKelvey	26.87	8560	9.05	0.40
Lower Knobloch	23.57	9318	5.66	0.50
Nance	24.39	9034	6.37	0.42

Overburden

Montco Mine Plan Area Overview

Throughout the Montco project area the overburden is about 80 feet thick, the interburden about 15 feet thick. The lithology--the structure and composition of the underground rock formation--consists mainly of intermixed beds of soft sand, silt, and clay materials, in association with shale and sandstone.

On the average, the overburden has an alkaline pH, is moderately saline, and often sodic. (In this text "overburden" will include interburden. Overburden is the material between the upper coal seam and the soil; interburden is the material between coal seams.) Overburden texture is typically clay loam or loam and the saturation percentage--a measure of water and nutrient-holding capacity--is moderate. Trace element concentrations are generally low.

Overburden clay mineralogy--clay mineral composition--was determined from samples taken from two holes drilled in the North King and South O'Dell mining units. Illite and kaolinite clay minerals dominated all sample increments analyzed. Chlorite was present in small amounts and no smectite was detected. The presence of smectite, however, is indicated in some of the mining units by high saturation percentages. (See chapter III, Geology, Overburden.)

For the remainder of this text, as well as the overburden text in chapter III, the following definitions apply:

"Favorable overburden," as it applies to the postmining rootzone, is material which does not meet any of the unsuitability criteria listed in table II-4. On the other hand, "unfavorable overburden" is material that does meet any of the criteria listed in the table. "Moderately favorable" overburden, which has some of the properties of both favorable and unfavorable materials (table II-4), was discussed in the draft EIS. However, Montco no longer proposes to use this material in the postmining rootzone, and therefore "moderately favorable" overburden will not be discussed in this EIS.

Proposed Permit Area--North King Mining Unit

For the North King mining unit overburden, physiochemical characteristics were determined from a total of 469 sample increments from 22 drill holes. A summary of the analyses by drill hole is presented in table II-5.

The drill hole samples can be divided into two very different sets--those consisting largely of burn material, commonly called porcelanite or scoria (4449-1, 4449-12D, 4449-17B, 4449-16B, 4449-16D, 4449-19W, 4449-20, 4449-23, 4449-13A, 4449-11A, 4449-8A, and 4449-14A), and those from the remainder of the unit associated with the unburned coal beds.

The porcelanite materials exhibit low sodicity, salinity and low to moderate saturation percentages; have a moderately alkaline pH; and range in texture from sandy loam to silt loam when crushed and passed through a 0.85 mm sieve. The level of the majority of the trace elements tested is low.

The second set of drill hole samples, associated with existing unburned coal beds, are sometimes saline and often sodic. Saturation percentages are moderate to high, and the pH is moderately alkaline. Textural classes are mostly loams, clay loams, and silt loams. Trace element concentrations are low.

General Description of Remaining Mine Plan Area Units

South King Mining Unit

Information on the physiochemical characteristics of the South King mining unit overburden is limited since samples from only five drill holes

TABLE II-4

Unsuitability Criteria for Overburden and Regraded Spoil

Characteristic	Suspect Level[1]	
pH	< 5.5 > 8.5	
Conductivity (mmhos/cm)	> 4.0-8.0[2]	
Saturation percentage	< 25% > 85%	
Exchangeable sodium percentage	> 15.0	clay loam (≦35% clay), silty clay loam (≦35% clay, ≧15% sand), sandy clay loam, silt loam (≧20% clay, ≧15% sand), loam (≧20% clay)
	> 18.0	sandy loam, loam (<20% clay), silt loam (<20% clay, ≧15% sand)
Sodium adsorption ratio	> 11.0	clay loam (≦35% clay), silty clay loam (≦35% clay, ≧15% sand), sandy clay loam, silt loam (≧20% clay, ≧15% sand), loam (≧20% clay)
	> 14.0	sandy loam, loam (<20% clay), silt loam (<20% clay, ≧15% sand)
Boron	> 5 ppm	
Molybdenum	> 0.5-1.0 ppm[3]	
Selenium	> 0.1 ppm	
Textural class	clay, sandy clay, silty clay, clay loam (>35% clay), silty clay loam (>35% clay, <15% sand), silt loam (<15% sand), silt, loamy sand, sand	

Source: This table is based on a recent, extensive literature review by the Department of State Lands technical staff. The literature review was done in conjunction with the preparation of revised draft soil and overburden guidelines in 1983. These draft guidelines remain unofficial and may change.

[1] The suspect levels are to be used as a guide in evaluating the suitability of material for reclamation. An evaluation should take into account the "total system". Interactive parameters may either nullify or verify the significance of a potential problem.

[2] The actual maximum acceptable salt level will depend on the plant species proposed in the revegetation plan and the potential for upward salt movement.

[3] The actual maximum acceptable molybdenum level will depend upon the plant species proposed in the revegetation plan and their potential for molybdenum accumulation.

TABLE II-5

Weighted Average of Overburden/Interburden Physiochemical Characteristics for each Drill Hole in the North King Mining Unit

Drill Hole No.	Sat. %	pH	EC mmhos/cm	SAR	ESP	H_2O Soluble Ca	H_2O Soluble Mg	H_2O Soluble Na
						meq/1	meq/1	meq/1
4449-1	39.4	8.0	3.1	3.0	5.2	8.7	20.7	12.2
4449-2C	61.4	7.6	4.2	21.3	17.5	4.8	10.3	35.5
4449-3C	69.8	7.7	3.9	26.5	15.6	2.4	4.5	43.3
4449-4C	61.4	7.7	3.8	20.6	11.7	2.6	10.5	37.0
4449-5C	64.0	7.7	4.3	37.7	22.4	1.9	6.6	47.3
4449-6C	63.4	8.1	5.0	35.8	22.8	2.7	5.9	51.5
4449-7C	37.7	7.5	2.7	12.4	6.1	4.8	8.8	21.8
4449-70BC	32.7	7.0	1.5	5.0	4.0	1.4	4.8	10.4
4449-8A	54.5	7.9	3.6	8.4	- -	8.5	12.3	25.1
4449-11A	37.6	7.5	1.5	1.3	- -	5.6	8.3	4.3
4449-12D	49.1	7.6	3.6	9.0	6.0	7.8	14.7	25.3
4449-13A	86.2	8.1	4.5	31.7	- -	3.5	6.2	51.2
4449-14A	54.1	7.5	5.6	13.2	- -	13.1	16.5	47.4
4449-16B	31.5	8.1	0.4	0.6	1.0	0.2	2.6	0.8
4449-16D	32.0	8.3	0.9	4.0	4.0	0.2	2.8	5.5
4449-17B	39.5	7.9	2.8	5.6	5.4	7.4	12.7	17.8
4449-19W	37.8	8.0	2.8	11.5	11.5	2.0	6.8	22.4
4449-20	36.6	7.7	2.0	2.0	- -	10.2	11.3	5.1
4449-21C	42.6	7.8	5.3	24.7	- -	5.6	10.6	51.1
4449-22C	57.4	7.6	4.5	35.2	31.1	3.9	7.3	42.9
4449-23C	42.8	8.3	7.4	14.4	- -	20.3	21.9	55.6
4449-26C	67.0	7.7	4.3	39.2	23.3	5.0	7.4	37.6

TABLE II-5

Weighted Average of Overburden/Interburden Physiochemical Characteristics for each Drill Hole in the North King Mining Unit (continued)

Drill Hole	Parts Per Million															Percent			
No.	NO3-N	NH4-N	P	K	B[2]	Se[2]	Cd[2]	Cu	Fe	Pb	Mn	Hg[2]	Mo[2]	Ni[2]	Zn	Sand	Silt	Clay[1]	Texture[3]
4449-1	0.4	2.1	2.5	335	0.9	.02	.04	2.4	35	1.7	9.0	.05	.22	0.35	1.8	40.4	39.1	20.5	L
4449-2C	0.8	23.9	1.0	259	1.0	.02	.16	7.9	202	4.8	18.5	.05	.32	4.08	13.0	21.7	38.6	39.7	CL
4449-3C	9.0	15.2	0.8	264	2.8	.02	.12	4.2	103	3.6	11.4	.05	.39	3.41	7.6	28.4	35.4	36.3	CL
4449-4C	2.6	16.6	0.8	276	1.6	.02	.12	4.4	90	4.1	9.0	.05	.41	26.3	6.9	21.1	39.3	39.6	CL
4449-5C	3.3	20.4	0.9	250	3.7	.02	.11	4.9	119	4.7	8.88	.05	.28	4.39	15.3	23.6	34.9	37.7	CL
4449-6C	8.6	19.2	1.0	265	5.0	.02	.11	6.0	221	4.0	19.7	.05	.29	4.03	10.6	26.4	38.8	34.7	CL
4449-7C	1.0	12.6	0.8	109	1.8	.02	.07	2.5	89	3.7	9.7	.05	.29	1.78	3.4	34.7	43.2	22.1	L
4449-70BC	3.9	11.7	0.8	53	1.4	.02	.08	1.5	54	1.7	5.6	.05	.19	0.94	2.2	40.1	42.6	17.3	L
4449-8A	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	25.4	43.0	31.6	CL
4449-11A	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	50.9	37.6	11.5	L
4449-12D	4.3	9.0	1.4	270	1.5	.02	.09	2.2	83	2.6	15.0	.06	.23	1.42	3.7	14.2	54.6	31.2	SiCL
4449-13A	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	37.1	40.2	22.7	L
4449-14A	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	52.1	27.6	20.3	SCL
4449-16B	0.4	1.5	0.6	673	0.4	.02	.02	0.3	46	0.4	5.0	.06	.71	0.15	1.5	49.6	44.6	5.8	SL
4449-16D	0.4	8.0	0.9	245	0.5	.02	.02	1.5	35	0.3	5.5	.08	.32	0.22	1.4	14.9	73.1	12.0	SiL
4449-17B	1.9	4.5	2.3	409	0.8	.02	.03	0.8	68	0.6	11.1	.05	.29	0.28	1.5	17.5	67.1	15.4	SiL
4449-19W	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	16.2	61.3	22.6	SiCL
4449-20	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	26.0	60.1	11.9	SiL
4449-21C	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	19.8	55.7	24.5	SiL
4449-22C	0.6	30.2	1.2	258	1.1	.03	.10	2.5	106	2.8	8.7	.06	.27	3.14	2.3	29.7	47.8	22.5	L
4449-23C	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	42.2	42.3	15.4	L	
4449-26C	5.5	30.5	2.0	272	1.2	.02	.07	3.2	131	3.9	9.2	.06	.42	4.73	3.2	29.3	34.6	36.1	CL

---

[1] Clay content overestimated by 5-12% due to use of 2-hour rather than 8-hour settling time in lab procedure.

[2] Many Sample analyses for these elements were reported as less than the indicated minimum (detection limit); however, means were calculated by dropping the less-than (<) sign.

[3] L - Loam, CL - Clay Loam, SiC1 - Silty Clay Loam, SiL - Silt Loam, SL - Sandy Loam, SCL - Sandy Clay Loam.
(- -) indicates no data available.

have been taken and analyzed to date. Additional data would be necessary for future permit applications.

Based on the few samples taken, more than adequate amounts of overburden material is favorable for use in the rootzone. (See table III-1 in chapter III.) In general, trace element concentrations are low. Isolated areas in a few drill hole samples exhibited unusually high levels of lead and manganese, but these levels were attributed to contamination by drilling grease (Dollhopf and Intrasearch, Inc., 1980).

North O'Dell Mining Unit

As with the South King mining unit, physiochemical information on the North O'Dell mining unit is limited, since only two overburden holes have been drilled in this area. Nonetheless, the data indicate the presence of highly sodic and moderately saline material. In addition, much of the material is clayey (greater than 40 percent) and saturation percentages often exceed 100, and sometimes 200 indicating the presence of smectite (swelling clays).

South O'Dell Mining Unit

Physiochemical characteristics of the South O'Dell mining unit are based on the analyses of 19 drill holes. Overburden here is moderately alkaline, is generally low in salinity, and often sodic, although large zones of nonsaline and nonsodic materials are present. (See chapter III, table III-1.) The texture of the material is usually clay loam, ranging from silty clay loam to loam, and the saturation percentages are moderate. Trace element concentrations are generally low.

South Gate Mining Unit

Physiochemical characteristics of the South Gate mining unit are based on the analyses of 22 drill holes. Overburden here has an alkaline pH, is generally low to moderately saline, and often sodic. The texture ranges from clay to loam. Saturation percentages are moderate to very high. Saturation percentages greater than 100 are not uncommon, indicating the presence of smectite (swelling clays). Clay mineralogy was not directly determined for this unit.

Trace elements are generally low. However, molybdenum concentrations are at or above the upper suspect level (1.0 ppm) given in table II-4 in about one-third of the core lengths drilled in this mining unit.

HYDROLOGY

Summary: All surface drainage from the facilities area and North King mining unit flows to the Tongue River. The facilities and mining unit lie astride King Creek, an ephemeral tributary to the Tongue River. Montco proposes to mine 502 acres north of King Creek from beneath a bench. The Tongue River, unlike most water sources of lesser quality in southeastern Montana, is of high quality and is considered unique to the region.

Significant ground water resources in the mine area are limited primarily to alluvium of the Tongue River, its tributary ephemeral stream valleys, and the coal seams underlying Montco's mine plan area. There is also the possibility that sandstone aquifers of unknown vertical and lateral extent directly overlie or underlie the coal seams Ground water flow is from southeast to northwest, toward the Tongue River.

In the vicinity of the North King unit, King Creek alluvium in the lower mile of valley reach is believed to be dry or nearly dry. Ground water quality around the North King unit is best in the Tongue River alluvium and worst in the coal seams.

Surface Water

Surface water resources of the Montco mine plan area and adjacent reaches of the Tongue River Valley have been described briefly in a previous regional environmental impact statement, DES 79-41 (U.S. Department of Interior and Montana Department of State Lands, 1979), and elsewhere in more detail (Woessner et al., 1981; Knapton and Ferreira, 1980; Knapton and McKinley, 1977). In addition, the Montana Department of State Lands (DSL) and U.S. Office of Surface Mining (1982) recently reviewed the hydrology of the Tongue River Valley in response to a petition filed by interest groups to declare a portion of the valley and region unsuitable for surface coal mining.

Montco's North King mining unit is drained entirely by ephemeral tributaries to King Creek and the Tongue River (fig. II-2). Facilities and a railroad loop to serve the Montco Mine are proposed for near the mouth of Cedar Creek, approximately one-half to one mile southwest of the North King unit.

King Creek and Cedar Creek are ephemeral drainages adjacent to the North King unit. Table II-6 indicates the size of these drainages and compares them with other major ephemeral drainages in Montco's mine plan area. Ephemeral drainages flow only in response to infrequent, intense, or prolonged rainfall events, or during rapid snowmelt in the spring. All surface drainage within the North King unit and the mine plan area is northwestward to the Tongue River, a major perennial stream in the region.

The Tongue River headwaters lie in the Big Horn Mountains of north-central Wyoming. The river flows northeastward to join the Yellowstone River near Miles City, Montana. Total watershed area of the Tongue River is approximately 5,400 square miles; about 2,900 square miles lie upstream of Montco's

TABLE II-6

Major Ephemeral Drainages and
Watershed Areas in the Montco Mine Plan Area

Drainage	Watershed Area (square miles)
Poker Jim Creek	20.1
Poker Teechee Creek	5.7
Gate Creek	3.3
O'Dell Creek	46.3
Dry Creek	4.6
Cedar Creek	1.8
King Creek	12.6

mine plan area. Tongue River discharge extremes in the vicinity of the Montco mine area typically range from a minimum of about 200 cubic feet per second (cfs) to a maximum of about 2,000 cfs. Maximum discharge of record at Brandenberg Bridge downstream from the Montco Mine plan area was 8,340 cfs during a major flood in May 1978. Mean annual discharge of the river at the Tongue River Dam upstream of the Montco Mine plan area and at the gaging station near Brandenberg Bridge below this area each approximate 500 to 600 cfs.

Montco proposes to obtain a permit for 1,105 acres of mining and associated disturbance in the North King unit and another 169 acres for the facilities. These areas represent approximately 0.06 and 0.01 percent of the Tongue River watershed above the mine plan area. Montco's current plan ultimately calls for mining disturbance and facilities for approximately 5,600 acres, or 0.3 percent of the Tongue River drainage above the mine plan area.

The one spring located in the North King unit is the McKelvey Spring. This spring is named after the surface owner (Spring 35 in fig. II-1 and fig. II-2). The spring discharges at a relatively constant rate of approximately 2-5 gallons per minute (gpm) from the base of the Middle Knobloch-McKelvey burn adjacent to the Tongue River and its terraces. The hydrogeologic unit which supports this spring is not definitely known; however, the spring's recharge area may be the coal seams to the east, the clinker area itself, or a combination of both of these sources.

Other springs in or adjacent to the mine plan area are also shown on figure II-2. Table II-7 provides more information on springs in the mine plan area.

A summary of ranges of surface water quality for the mine plan area is shown on table II-8. Generally, water quality is typical of southeastern Montana, although the Tongue River is acknowledged to be of higher quality than other perennial streams in the region.

TABLE II-7

Springs in and Adjacent to Montco's Mine Plan Area

ID[2]		Location[3]				Date	Elevation[4]	Flow		
No.	Owner	T	R	S	QQQ	Filed	(Ft)	(gpm)	Use[5]	Name/Comments
1	H. Brey	3S	44E	27	center	–	3060	20.0	–	–
2	USFS	4S	44E	3	CDD	1951	3160	0.4	–	Bridge Creek
3	R.G. Schaudel	4S	44E	5	ADB	1920[6]	3000	3.0	–	–
4	USFS	4S	44E	13	DCC*	1938	3600	0.5	–	King Creek Pass
5	USFS	4S	44E	13	DCC	1938	3700	0.3	–	King Creek Pass
6	H.T. Wagner	4S	44E	19	ABC	1905	3040	1.0	S	–
7	USFS	4S	44E	26	CAA	1938	3600	0.1	–	King Creek No. 2
8	USFS	4S	44E	26	CBB	1938	3540	0.1	–	King Creek
9	USFS	5S	43E	12	DDC	1937	3560	0.75	S	–
10	USFS	5S	43E	27	BDC*	1937	3420	1.5	S	–
11	USFS	5S	44E	1	BBB	1938	3717	0.5	–	Good Creek
12	USFS	5S	44E	1	DCC	1938	3960	0.1	–	King Creek #1
13	USFS	5S	44E	1	AAA	1938	4100	0.5	–	Black Canyon
14	USFS	5S	44E	1	CDD	1938	3960	0.5	–	Twin
15	USFS	5S	44E	3	BCC	1938	3650	0.5	–	Hole in Wall
16	USFS	5S	44E	3	BCB	1938	3900	0.5	–	Hole in the Wall
17	USFS	5S	44E	10	AD*	1962	3450	0.75	–	East Fork O'Dell
18	USFS	5S	44E	11	AAB/C	1963	3850	0.7	S	E. Fork O'Dell #2
19	USFS	5S	44E	18	ADC	1937	3580	0.25	S	–
20	USFS	5S	44E	19	BDA	1937	4050	1.5	S	–
21	USFS	5S	44E	24	BAA	1938	3900	0.5	–	Brian Creek #1
22	USFS	5S	44E	25	DCC	1948	3850	0.4	–	Perry #2
23	USFS	5S	44E	25	BBB	1938	4080	0.1	–	Coal Bank
24	USFS	5S	44E	25	BDD	1938	3800	0.1	–	Rosie
25	USFS	5S	44E	25	CCC*	1938	3900	0.1	–	Soap
26	N. Woodward	5S	44E	27	DBD	1949	3540	–	S	–
27	USFS	5S	44E	29	BAB	1938	3900	1.0	S	–
28	USFS	5S	44E	33	CAC*	1937	3880	0.25	S	–
29	USFS	5S	44E	34	AAA	1940	3540	0.5	–	Water Gap
30	USFS	5S	44E	35	CCC	1938	3740	0.6	–	Lower Big
31	USFS	5S	44E	35	BDD	1938	3720	0.5	–	Old Road
32	USFS	5S	44E	36	ACD*	1963	3740	0.6	S	Butch
33	USFS	4S	44E	35	BAA	1938	3540	0.5	–	McKelvey
34	USFS	4S	44E	36	DBB*	1938	3750	0.5	–	Black Canyon #2
35	McKelvey	4S	44E	5	DC	–	3000	2-5	S	McKelvey

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[1] From Montana Office of the State Engineer records, Notices of Completion of Groundwater Appropriations without Wells.

[2] Located on figure II-2.

[3] B A Reads largest to smallest quarter section. In some cases (*) location description was altered from description in records to coincide with spring location indicated
C D on topographic map.

[4] All elevations determined from location on topographic map.

[5] Use: S = Stock
Forest Service springs generally used May 1 to December 1 annually.

[6] Used before 1920.

TABLE II-8

Typical Water Quality

		Project Area Springs		NCR[1] Springs		Stock Ponds		Project Area Streams		NCR[1] Streams		Tongue River	
Parameters	Units	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
pH		7.5	8.2	8.0	9.2	6.9	9.7	6.8	8.2	6.1	8.0	7.9	8.6
Specific Conductance	micromhos/cm @ 25°C	1440	11200	1090	3150	91	2630	105	1060	126	1826	430	1000
Sulfate	mg/l	678	6840	1	1035	6	1630	9	507	4	530	101	295
Total Alkalinity	mg/l $CaCO_3$	204	895	157	1380	23	285	39	104	29	166	91	278
Heavy Metals	mg/l	1	1	1	1	1	1	1	3	1	2	1	1

[1] NCR, Northern Cheyenne Reservation, west side of Tongue River.

With few exceptions, water quality for springs in the Montco Mine area exceeds recommended Federal standards for drinking water in sulfate and total dissolved solids. The springs are unsuited for irrigation purposes; however, spring water is typically used only for stock, for which it is acceptable.

Surface runoff impounded by stock ponds in the area varies significantly in quality throughout the year. Generally, water quality is best in the spring, following snowmelt accumulations.

Runoff samples collected from ephemeral tributaries to Tongue River occasionally exceed Federal drinking water standards for iron, manganese, sulfate, and total dissolved solids, although just as frequently water quality meets all drinking water standards. This water is rarely consumed by humans, however.

The Tongue River exhibits good water quality under most conditions, although total dissolved solids and sulfate concentrations exceed Federal drinking water standards about two thirds of the time. A medium salinity hazard exists when such water is used for irrigation, although it is readily used for irrigation without apparent adverse effects on irrigated crops.

Sediment yield from the North King unit is estimated by Montco to be about 450 tons per square mile per year ($T/mi^2/yr$). Assuming an average value of 100 pounds per cubic foot of sediment, this is equal to about 0.2 acre-feet per square mile per year ($AF/mi^2/yr$). This is a reasonable estimate when compared to a generally accepted average for the region of 0.5 $AF/mi^2/yr$ used by the Soil Conservation Service, or 0.035 $AF/mi^2/yr$ calculated by Ringen et al.

(1979). Sediment yield rates for the remainder of the mine plan area probably also fall within this range.

Based on field observations and data submitted by Montco, DSL has determined that the Tongue River is an alluvial valley floor (AVF) under Montana and Federal mining laws. No areas identified by DSL as being in the Tongue River AVF are included within Montco's North King mining unit, although Montco proposes facilities construction on a small acreage of irrigated fields within the Tongue River AVF. The determination by DSL concerning the Tongue River AVF applies only to that portion of the valley adjacent to the North King unit and the proposed facilities area. Alluvial valley floor determination beyond the present geographic area defined by DSL must await additional data from Montco.

Ground Water

Within and adjacent to Montco's North King mining unit there are several ground-water-bearing zones which are, in descending order, alluvium underlying King Creek and Tongue River, Middle Knobloch and Middle Knobloch-McKelvey clinker, Middle Knobloch coal seam, and McKelvey coal seam. Sandstone units also directly overlie or underlie the Middle Knobloch coal seam, although their significance and extent are unconfirmed at this time. Other aquifers, such as the Tullock Member of the Fort Union Formation, Hell Creek Formation and the Madison Group, occur at greater depths. The latter units have not been affected by mining in the region and are not discussed further. The Hell Creek Formation is known to be a reliable and excellent ground water source in the Tongue River Valley (Hopkins, 1973). It is too deep to be directly affected by surface mining, and because of its depth has not been intensively developed.

The most important ground-water-bearing units in the immediate North King unit vicinity appear to be near-surface coal seams and associated sandstone units of the Tongue River Member. Available evidence indicates that these units are recharged in the uplands of Custer National Forest to the east and southeast of the North King unit, as well as from the King Creek alluvium, and discharge to the Tongue River alluvium to the northwest. Ground water flow in these units is to the northwest. Aquifer tests indicate that the coal seams are not very permeable and that combined ground water flow through the North King unit in these seams approximates 4 gallons per minute (gpm), or 0.009 cfs. There are no site-specific data to indicate how much ground water flows through the North King unit in sandstone units; however, based upon conditions documented elsewhere in the area, ground water flow in these units may be significant. If so, total ground water movement through the mining unit may be much greater than 4 gpm.

Available information suggests that little ground water occurs in King Creek alluvium down-valley from where Middle Knobloch clinker subcrops to the alluvium in the southeast corner of section 9 and northeast corner of section 16. Alluvial ground water appears to be lost to the general ground water flow northwestward through the North King unit; thus, little or no ground water from King Creek Valley discharges directly to Tongue River alluvium.

The hydrogeologic significance of clinker units in the North King unit is uncertain. Woessner et al. (1981) discuss clinker's regional importance to shallow ground-water systems in the Fort Union Formation, and Stiller (1979) has suggested that even small areas of clinker may be of local hydrogeologic significance. The major exposure of Middle Knobloch and McKelvey clinker within the North King unit suggests that rapid recharge probably occurs locally from direct precipitation and snowmelt. Ground water movement within clinker is highly irregular and unpredictable, due to the irregular subsurface contact between the clinker and underlying bedrock units. However, field observations of vegetative vigor suggest that flow within this clinker area is northwestward toward the Tongue River Valley.

This clinker exposure in the North King unit may be a major recharge area for the McKelvey Spring which discharges from its base in the west side of the unit. However, constancy of water quality throughout the seasons of the year and a relatively constant spring discharge rate suggest a more regional source for the spring. Water chemistry between the Middle Knobloch and McKelvey Spring suggests a similarity between McKelvey Spring water and ground water samples taken from a nearby observation well completed in the McKelvey Coal Seam. Accordingly, it is thought that the McKelvey Spring's source is at least in part the McKelvey coal seam.

Measurable ground water occurrence in the entire Montco Mine plan area appears to be largely restricted to coal seams, valley alluvium, and possibly associated sandstone units. As shown in figure II-3, coal seams underlying the Montco area pinch out or merge to the northeast. The seams also very laterally in thickness and stratigraphic position. Only the Middle Knobloch seam continuously underlies the entire area.

Alluvium underlying the Tongue River is composed of sediments of varying lithologies up to cobble size, while alluvium of the ephemeral tributaries is composed of local sedimentary rock types and contains much clinker. These alluvial aquifers generally have water table systems. Ground water flow through the Tongue River alluvial aquifer is estimated at 350 gpm.

Ground water in the coal seams is generally under confined conditions, and at least some portions of the Knobloch seams are fully saturated throughout the entire mine plan area. Where present, the McKelvey and Nance coal seams are saturated throughout the mine plan area.

Recharge to the coal seams occurs in the uplands of the Custer National Forest to the southeast. Ground water flow in the coals is northwestward to the Tongue River, where discharge is directly or indirectly to the Tongue River alluvial system. Permeabilities within the coal seams vary throughout the mine plan area and tend to increase toward the southwest.

Ground water wells in the Montco Mine plan area are shown on figure II-2. At least three wells (numbers 30, 33, and 57) lie within the proposed facilities area and the North King unit.

Ground water in the Montco Mine plan area is generally potable and suitable for most purposes, although poor quality water may occur in discrete areas. Table II-9 provides ranges in selected water quality parameters for four types of wells in the area. Water from alluvial aquifers represents the highest quality ground water in the area. Many homeowner's wells are completed in Tongue River alluvium or in bedrock units well below the coal seams.

TABLE II-9

Typical Groundwater Quality, Montco Mine Area

		Alluvial Aquifers		Coal and Interburden Aquifers		Homeowners' Wells		Nance Aquifers Wells	
Value	Units	Low	High	Low	High	Low	High	Low	High
pH		6.9	7.6	6.9	10.1	7.1	8.2	7.9	8.4
Specific Conductance	micromhos/cm @ 25°C	1050	2485	1660	7895	1129	1880	1165	1990
Sulfate	mg/l	15	519	2	3670	1	263	1	2.0
Total Alkalinity	mg/l $CaCO_3$	363	1290	413	1570	375	1160	286	1080
Heavy Metals	mg/l	1.0[1]	1.0[1]	1.0[1]	1.0[1]	1.0	1.0	1.0	1.0

Source: Montco, 1983, vol. 12, table Bc-5.

[1] Except iron.

SOILS

Summary: The soils of the Montco Mine plan area vary widely in their depth, texture, color, profile morphology, coarse fragment content, and salt and sodium content. This diversity reflects the variability of topography, parent materials, vegetation, and past land uses.

General Overview

Lowlands of the mine plan area are characterized by alluvial soils of the Tongue River flood plain and its major tributaries. The soils are generally deep; occur on nearly level or gently sloping areas; range from gravelly and sandy loams to clays; and are very poorly to well drained. They vary in their sodium adsorption ratios (SAR-an indicator of sodium content) and electrical conductivities (EC-a measure of soluble salt content, or salinity). Carbonates are common in the C (lower) horizons.

Uplands of the Montco Mine plan area consist primarily of residual, colluvial, or locally derived alluvial soils. A significant portion of these soils are shallow (less than 20 inches) or moderately deep (20-40 inches); are poorly developed; may contain abundant coarse fragments; and occur on moderate to very steep slopes (15 to 70 percent). They are principally derived from shales, sandstone, siltstone, and porcelanite (also called scoria or clinker);

are commonly calcareous in the C horizons; contain various quantities of sodium and soluble salts; and are usually well to excessively drained. On the benches and plateaus, deeper soils and gentler slopes are common.

The information contained here on soils in the Montco Mine plan area comes from a study that took place from September 1979 to April 1980. At this time Montco conducted an intensive (Order I) soil survey on about 10,000 acres in the northern portion of the Montco Mine plan area, including the proposed facilities area and the proposed North King, South King, North O'Dell, and South O'Dell mining units. The South Gate unit has been mapped less intensively (Order III) by the Rosebud County Soil Survey Staff, U.S. Soil Conservation Service. The Rosebud County Soil Survey is not scheduled to be published until late 1985.

North King Mining Unit

About 502 acres in the North King unit would be disturbed by mining activities, although salvageable soils only cover about 402 acres. Of this total mining area, about 37 percent is now suitable for cultivation with very severe limitations; 46 percent is suitable only for rangeland and wildlife habitat; and 15 percent is limited to wildlife habitat and aesthetic purposes (U.S. Department of Agriculture, Soil Conservation Service, unpublished soil survey, Rosebud County Area, Montana). The remaining two percent is occupied by scoria rock outcrop, disturbed land, and water. Disturbed land consists of existing roads and small areas of associated borrow pits. Areas mapped as water are primarily comprised of abandoned stream meanders and large stock ponds.

The major factor limiting land use in this area is erosion, mostly from dissected topography and periodic drought. In addition, the vegetative productivity of these soils is low--600 to 1,000 pounds per acre--and the soils are only poorly to moderately well developed. None of the soils meet the criteria for prime farmland.

Proposed Facilities Area and Transportation Corridors

Most of the soils in the proposed facilities area and transportation corridors (mine roads, conveyor, rail loop) are similar to those in the proposed North King unit. The facilities area and transportation corridors would disturb approximately 169 acres. Salvageable soils cover about 121 of these acres. Of the total area, 11 percent is suitable for cultivation with severe limitations; 37 percent is suitable for cultivation with very severe limitations; 49 percent is suitable for rangeland and wildlife habitat; and two percent is suitable for wildlife habitat and aesthetic purposes. The remaining area consists only of sandstone rock outcrop.

Railroad Transportation Corridor

Montco intends to include within its permitted and bonded area the part of the Tongue River Railroad mainline corridor adjacent to its double-track loop. Montco has submitted two plans for alternate reclamation of the transportation corridor. (See chapter III, Soils.)

Prime Farmland Soils

About eight acres of potential prime farmland soils would be removed during railroad loop construction. Another nine acres lie within the loop but would not be disturbed. The eight acres comprise three soil mapping units--the Havre loam, Harlem clay loam and Glendive sandy loam--classified by the U.S. Soil Conservation Service as prime farmland soils if irrigated.

According to the Federal regulations (7 CFR 657) (adopted by DSL), two of the three units may not in fact be prime farmland soils. The Havre loam has EC values greater than 7 mmhos/cm in the top 40 inches in half of the samples taken, exceeding the Federal limit of 4 mmhos/cm. The Harlem clay loam has a permeability of less than 0.06 inch per hour, under the Federal minimum of 0.06 inch per hour. Therefore, whether or not these soils qualify as prime farmland in this specific area is questionable. Additional sampling would confirm or reject the prime farmland designation. In any case, the company plans to treat these soils as prime farmland.

County Road Relocation

Montco proposes to relocate the existing county road and salvage all favorable soil material within ten feet on either side. The relocation would disturb about 3 acres of potential prime farmland soils. (See chapter III, Soils.)

VEGETATION

Summary: Typical grasses of the northern Great Plains dominate the Montco study area, with areas of ponderosa pine and juniper, deciduous forest species, and badlands vegetation scattered throughout the area in smaller amounts.

The Vegetation Study Area

Overview

Data were collected in 1977, 1978, and 1979 to produce a vegetation baseline inventory for the 25,000-acre Montco vegetation study area (Montco, 1983, vol. 16 and 16A, app. F). Other vegetation studies and inventories have also been conducted on or near the area (Batson and Elliott, 1975; Morris and Lovegrove, 1975; Taylor et al., 1975; and Brown, 1971).

Grasslands typical of the northern Great Plains dominate the study area. Western wheatgrass (*Agropyron smithii*) and blue grama (*Bouteloua gracilis*) are dominant, with needle-and-thread (*Stipa comata*) and bluebunch wheatgrass (*Agropyron spicatum*) common on coarser soils. Big sagebrush (*Artemisia tridentata*) is abundant on uplands and "breaks" (steep, highly eroded slopes).

Drainage bottoms often support stands of silver sagebrush (*Artemisia cana*) with an understory of western wheatgrass. Greasewood (*Sarcobatus vermiculatus*) occurs in extensive stands on river terraces.

On steep slopes, coarse soils derived from sandstone or scoria support little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), bluebunch wheatgrass, and skunkbush sumac (*Rhus trilobata*). Ponderosa pine (*Pinus ponderosa*) and Rocky Mountain juniper (*Juniperus scopulorum*) form stands where the sites are moderately moist.

Dominant species on badlands include big sagebrush, shadscale saltbush (*Artiplex confertifolia*), greasewood, and bluebunch wheatgrass. Stands of Rocky Mountain juniper are found where these sites are moderately moist.

Deciduous forest dominated by plains cottonwood (*Populus deltoides*), box elder (*Acer negundo*), and green ash (*Fraxinus pennsylvanica*) is common on the Tongue River bottomland.

Five major flora, or groups of plants from a particular region, make up the study area. Mixed prairie species are dominant. Tall grass prairie species grow on localized sites with higher available moisture. Ponderosa pine, Rocky Mountain juniper, and skunkbush sumac--all derived from the Rocky Mountain flora--are also found on localized sites where soil and topographic factors increase available moisture. Species of the Great Basin flora are abundant. Shadscale saltbush, Nuttall saltbush (*Atriplex nuttallii*), greasewood, fringed sagewort (*Artemisia frigida*), yucca (*Yucca glauca*), alkali saltgrass (*Distichlis stricta*), winterfat (*Ceratoides lanata*), and sagebrush species (*Artemisia* spp.) are conspicuous examples. A few boreal forest species, such as serviceberry (*Amelanchier alnifolia*) and red-osier dogwood (*Cornus stolonifera*), are found in small amounts.

Rare Species

Montco's plant species list includes *Hymenopappus filifolius* and *Eriogonum pauciflorum* as species occuring on the study area. Varietal forms of these species have been identified by the Montana Rare Plant Project (Lesica et al., 1984) as having either a peripheral or regional endemic distribution in Montana.

Ethnobotany

The use of native plants by Northern Cheyenne in or near the Montco vegetation study area has not been extensively studied; however, 25 plant species found in southeastern Montana were reported to be used by the Northern Cheyenne Indians (Hart and Moore, 1976). (See table II-10.)

Many of the plant species listed in table II-10 are common throughout southeastern Montana. Three species, however, were not found on the study area during field surveys. The first, red baneberry (*Actaea rubra*), would be expected to occur in moist streambank habitats; it probably was overlooked in the dense growth along the Tongue River. The second, sweetgrass (*Hierochloe*

TABLE II-10

Plant Species of Southeastern Montana Used by the Northern Cheyenne Tribe

Common Name	Scientific Name	Brief Description of Use
box elder[1]	*Acer negundo*	making sacred utensils
western yarrow[1,2]	*Achillea millefolium*	medicine; religious ceremonies
red baneberry	*Actaea rubra*	medicine; religious ceremonies
green ash[1]	*Fraxinus pennsylvannica*	construction; handiwork
red-osier dogwood[1]	*Cornus stolonifera*	smoking; arrows
pineapple weed[1]	*Matricaria matricarioides*	perfume
eastern lomatium[1]	*Lomatium orientale*	medicine
rush skeletonweed[1]	*Lygodesmia juncea*	medicine; tea
sweetgrass	*Hierochloe odorata*	incense; religious ceremonies
curlycup gumweed[1]	*Grindelia squarrosa*	medicine
American licorice[1]	*Glycyrrhiza lepidota*	medicine; chew
Rocky Mountain juniper[1,2]	*Juniperus scopulorum*	medicine; bows; religious ceremonies
purple coneflower[1]	*Echinacea pallida*	medicine
plains pricklypear[1]	*Opuntia polyacantha*	food
kinnikinnick[1]	*Arctostaphylos uva-ursi*	medicine; religious ceremonies
choke cherry[1,2]	*Prunus virginiana*	medicine; food
cudweed sagewort[1] (also called white "man" sage)	*Artemisia ludoviciana*	medicine; religious ceremonies; incense
ponderosa pine[1,2]	*Pinus ponderosa*	gum; handiwork
rose[1,2]	*Rosa* spp.	medicine; tea
field mint[1]	*Mentha arvensis*	tea; perfume; aphrodisiac
yampa	*Perideridia gairdneri*	food
showy milkweed[1]	*Asclepias speciosa*	medicine; gum; food
willow[1]	*Salix* spp.	medicine; religious ceremonies
eastern cottonwood[1]	*Populus deltoides*	construction; animal food; paint; religious ceremonies
horsemint[1]	*Monarda fistulosa*	horse perfume

Source: Montco, 1983, vol. 16, app. F.

[1] included in list of species found in the 25,000-acre Montco vegetation study area.

[2] included in Montco's revegetation plan.

odorata) is uncommon in southeastern Montana for unknown reasons. The third, yampa, (Perideridia gairdneri), has been greatly reduced in abundance due to extensive gathering by Northern Cheyenne (Montco, 1983); the entire root system is dug up for food, so harvesting is extremely destructive.

Proposed Permit Area

Overview

Of the 14 vegetation community types mapped on the 25,000-acre study area, ten were found in the proposed permit area (North King mining unit and facilities area). Table II-11 lists these plus six other land types.

Most community types are named for their dominant species, but there are a few exceptions. The "breaks complex" is dominated by big sagebrush, shadscale saltbush, and greasewood shrubs, and bluebunch wheatgrass, western wheatgrass, little bluestem, and Japanese brome grasses. The big sagebrush/bunchgrass community type includes, as its major bunchgrass, either bluebunch wheatgrass or needle-and-thread. The "sidehill complex," so named because of the variability of proportions of dominant species, usually contains little bluestem, sideoats grama, bluebunch wheatgrass, blue grama and needle-and-thread.

The most widespread vegetative community found in the proposed permit area is the ponderosa pine/juniper/bluebunch wheatgrass type. This community is actually an ecotone (transitional community) between a juniper/bluebunch wheatgrass community and a ponderosa pine/bluebunch wheatgrass community.

The remaining vegetation types in table II-11 are self-explanatory, except for the following: the agricultural land type differs from the crested wheatgrass type in that it is irrigated; the crested wheatgrass is dryland hayed. The area mapped as "water" consists of stock ponds and abandoned stream meanders. "Weed" consists of undesirable weedy species, probably the result of overgrazing. "Homestead" consists of abandoned buildings and corrals that are part of an old homestead.

Range Condition and Recommended Stocking Rates

At present, the range condition of the proposed permit area is "low good," with existing vegetation at about 51 percent of climax overall. The range trend is stable. The recommended stocking rate (RSR) (not including agricultural or disturbed areas) is 231 cow-calf units for a one-month grazing period, or 26 cow-calf units for a nine-month period. The potential RSR is 241 cow-calf units for a one-month grazing period, or 27 cow-calf units for a nine-month period (assuming high-good range condition, with vegetation at about 75 percent of climax).

TABLE II-11

Vegetation Community Type Acreages of the Proposed Permit Area

Vegetation Type	--------------Facilities Area (Disturbed) Transportation Corridor	Other	Total Disturbed--------------	North King Mining Unit (Disturbed)	Permit Area Total Acreage (Disturbed)	Total Permit Area Acreage (Disturbed and Undisturbed)
Ponderosa pine/Juniper/Bluebunch wheatgrass	7.06	12.15	19.21	95.49	114.70	336.33
Breaks	0.00	2.09	2.09	70.00	72.09	80.43
Silver sagebrush/Western wheatgrass	4.07	5.95	10.02	0.17	10.19	61.76
Greasewood/Western wheatgrass	0.00	5.35	5.35	4.59	9.94	11.24
Big sagebrush/Western wheatgrass	2.08	12.42	14.50	125.04	139.54	160.61
Big sagebrush/Bunchgrass	0.28	8.07	8.35	92.27	100.62	128.78
Sidehill Complex	14.04	5.14	19.18	46.04	65.22	157.71
Western wheatgrass/Blue grama	0.85	23.85	24.70	61.60	86.30	128.19
False tarragon sagewort/Needle-and-thread	0.00	1.63	1.63	0.00	1.63	3.67
Needle-and-thread/Blue grama	8.89	28.24	37.13	4.66	41.79	133.71
Agricultural	3.03	19.09	22.12	0.00	22.12	49.33
Rock Outcrop/Cliff	0.00	1.16	1.16	0.00	1.16	3.07
Crested wheatgrass	0.79	2.93	3.72	0.00	3.72	14.69
Water	0.00	0.00	0.00	1.84	1.84	1.84
Weed	0.00	0.00	0.00	0.00	0.00	0.23
Homestead	0.00	0.23	0.23	0.00	0.23	2.29
TOTAL	41.09	128.30	169.39	501.70	671.09	1,273.88

Source: Montco, 1983, vol. 3, chap. IV.

AQUATIC ECOLOGY

Summary: Aquatic populations within the mine plan area are limited both in number and species diversity. The populations are restricted to several springs and manmade structures (stock ponds and water troughs). The Tongue River lies adjacent to the mine plan area and is of good quality compared to other streams in the area.

The aquatic ecology of the Tongue River and its tributaries near the proposed Montco Mine plan area has been described in studies undertaken by the Montana Department of State Lands and U.S. Department of the Interior (Tongue River Petition Evaluation Document, 1982), Montana Department of Fish Wildlife and Parks (Elser and McFarland, 1977), Gore (1976), and others. Montco presented the results of a one-year study of the aquatic ecology of the proposed mine area in their permit application.

The algae, macroinvertebrates, and fish populations of the surface waters on and near the Montco Mine plan area were sampled and analyzed. Total dissolved solids, total suspended solids, oxygen content, pH, and temperature, were monitored over a one-year period. A survey of aquatic macrophytes was also completed by the Montana Water Quality Bureau (Regele et al., 1982).

The Montco Mine plan area (fig. II-2) spans numerous ephemeral drainages. King Creek is the northernmost, Poker Jim Creek the southernmost. Watershed acreages for major drainages are presented in table II-6. Mining activity is proposed to begin in the King Creek drainage and progress southward through O'Dell Creek; the final cuts would take place at the mouths of Poker Jim and Poker Teechee Creeks.

With the exception of one spring, the only constant water sources in the North King mining unit are stock ponds and watering troughs. Flows from these average 0.01 cubic feet per second (cfs). Overflows run 80 to 150 yards down creek bottoms. Usually the wet zone is only six inches wide and about 0.5 inches deep. Small pools may also exist.

Because all streams in the mine plan area are ephemeral, aquatic flora and fauna are limited to organisms tolerant of short-lived water occurrences, low flows, and high temperatures. In general, fewer kinds and numbers of plants and animals are present in these ephemeral drainages than in areas with perennial flows. Table II-12 presents a list of the organisms found during the aquatic surveys. With the exception of two species, all organisms collected are adapted to life in temporary ponds or slow-moving, brackish water.

All eight of the streams in the proposed mine plan area drain northwesterly to the Tongue River, which flows alongside the mine plan area. The Tongue River is unique within the area: it contains relatively low levels of the sodium and sulfates characteristic of other rivers in the Ashland area. It also drains a large area, with the Tongue River Dam maintaining year-round flow and acting as a settling pond to remove silt from upstream disturbances. As a result, the flora and fauna of the river are more typical of western than eastern Montana.

TABLE II-12

Taxa Collected from Ephemeral Drainages on the Montco Project Area

- *Ephemeroptera*

- *Diptera*
  - Baetidae
    - *Callibaetis* sp.

- *Odonata*
  - Coenagrionidae
    - *Amphiagrion abbreviatum*

- *Hemiptera*
  - Corixidae
    - *Cenocrixa utahensis*
    - *Sigara* sp.

  - Gerridae
    - *Gerris* sp.
    - *Gerris bueoni*
    - *Gerris remigis*

  - Notonectidae
    - *Notonecta undulata*

- *Coleoptera*
  - Dytiscidae
    - *Agabus* sp.
    - *Derovatellus* sp.
    - *Rhantus* sp.
    - *Oreodytes* sp.

  - Hydrophilidae
    - *Hydrobius* sp.
    - *Tropisternus* sp.
    - *Ametor* sp.
    - *Helophorus* sp.
    - *Berosus* sp.

  - Haliphlidae
    - *Haliphlus* sp.

  - Chrionomidae
    - *Psectrotanypus* sp.
    - *Diamesa* sp.
    - *Dhironomus* sp.
    - *Acricotopus* sp.
    - *Cricutopus sylvestris*

  - Culicidae
    - *Culex* sp.
    - *Psorophora* sp.

  - Simuliidae
    - *Simulium* sp.

- *Nematomorpha*
  - Gordidae
    - *Gordius* sp.

- *Gastropoda*
  - Lymnaeidae
    - *Lymnaea* spp.

The diversity of the algae in the Tongue River has been described as good (Bahls et al., 1980), with dominant species capable of tolerating a wide range of environmental conditions. Complete taxa lists are included in the permit application. Abundant diatom species include *Achnanthes minutissima*, *Cymbella affinis*, *Rhoicosphenia curvata*, *Cocconeis placentula*, *Gomphonema angustatum*, *Navicula tripanctata*, and *Nizschia spp*. Common macrophytes found in the river are *Potamogeton* spp., *Veronica* sp. *Catabrosa* sp. and *Sagittaria* sp. The most abundant macroinvertebrates present are the beetles (*Microcylloepus pusillus*), caddis flies (*Hydropsyche* spp.), mayflies (*Ephemerella* spp.), and members of the true flies (*Simulium* spp. and *Chironomus* spp.).

The Tongue River bed is composed mostly of sand, gravel, and cobbles; silt makes up slightly over 10 percent of the area. Gravel and cobbles offer better habitat than sandy and silty substrates, and therefore support a much more diverse population of aquatic insects. Moreover, many species of fish, such as the smallmouth bass often found in the area, usually nest on a gravel base. In general, in the Tongue, gravel and cobbles make up 50 to 80 percent substrate and are most common in reaches adjacent to the northern end of the mine plan area. Sand is a major part of the bottom only within the stretches near the southern end of the mine plan area and is less common downstream toward the northern end of the area.

Pools and runs are the two most common habitat types adjacent to the Montco Mine plan area. Together, these habitats compose approximately 80-90 percent of the river area. Runs, characterized by flows in excess of one foot per second and depths greater than 0.8 feet, are by far the most common single type, making up over half of the river area. Other habitats found within the stretches examined were riffles and shallow, slack-water areas, together making up only 10-15 percent of the river area.

Tongue River fisheries were studied from Hanging Women Creek (5 aerial miles south of the mine plan area) to Otter Creek (just north of Ashland) by the Montana Department of Fish, Wildlife and Parks. Table II-13 presents a list of species found at that time. In general, larger individual fish were found within upstream stretches and smaller fish were downstream. The shorthead redhorse was captured in the greatest numbers and had the highest biomass in all areas sampled. Game fish such as smallmouth bass and northern pike were less abundant and therefore more difficult to sample. Smallmouth bass were the most important game fish found in the sample area. Approximately ten smallmouths were found per 0.62 mile (1 kilometer) of river during fall 1978. Smallmouth in the Tongue exhibited better growth rates than those in the Tongue River Reservoir, particularly during ages 1-3. Growth of smallmouth in the Tongue River is slower than in the reservoir after age three. Young smallmouth bass were found to usually feed on aquatic insects; older bass were found to feed on small yellow perch, crappies, and other small fish. Most young smallmouth bass had reached 100 millimeters in length by the end of the first growing season.

Other game fish were not found in sufficient numbers for population estimates or other life history characteristics; however, the northern pike was found to use the mouth of Hanging Woman Creek extensively for a spawning area. Life history characteristics of less important fishes such as the rock bass can be found in the permit application, on file with DSL.

TABLE II-13

Common and Scientific Names of Fish Captured Near the Montco Mine Plan Area

Common Name	Scientific Name
yellow perch	Perca flavescens
northern pike	Esox lucius
carp	Cyprinus carpio
longnose dace	Rhinichthys cataractae
flathead chub	Hybopsis gracilis
lake chub	Couesius plumbeus
fathead minnow	Pimephales promelas
golden shinner	Notemigonous crysoleucas
river carpsucker	Carpoides carpio
longnose sucker	Catostomus catostomus
white sucker	Catostomus commersoni
shorthead redhorse	Moxostoma macrolepidotum
mountain sucker	Catostomus platyrhynchus
stonecat	Noturus flavus
black bullhead	Ictalurus melas
channel catfish	Ictalurus punctatus
smallmouth bass	Micropterus dolomieui
pumpkinseed	Lepomis gibbosus
green sunfish	Lepomis cyanellus
black crappie	Pomoxis nigromaculatus
white crappie	Pomoxis annularis
rock bass	Ambloplites rupestris
walleye	Stizostedion vitreum
sauger	Stizostedion canadense

Water quality characteristics monitored during a study completed for the permit application included temperature, dissolved oxygen (DO) biochemical oxygen demand (BOD), total suspended solids, chemical oxygen demand (COD), pH, electrical conductivity, and nitrogen and phosphorus content. The amount of oxygen available to organisms is an important characteristic of streams. Game fish populations require 5 parts per million (ppm) dissolved oxygen to reproduce; they will die if the level drops below 3 ppm. The Tongue River appears to have adequate oxygen: the lowest concentration recorded, during winter, was 9.8 ppm and the samples for BOD and COD resulted in low values characteristic of unpolluted streams.

The pH or acid/base condition of the water of the Tongue River ranged between 8.0 and 9.1, relatively typical of most eastern Montana streams. Nitrogen and phosphorus, essential nutrients for plant growth, were generally found to be low but cyclical. Higher concentrations occurred during winter months when plant activity was reduced. Phosphorus content was low to moderate and at a relatively constant level throughout the year.

Total dissolved solids in the river were seasonal; they depended on the base flow and runoff. The highest concentration occurred during April 1979, prior to spring runoff. Later in the season, that level is diluted by melting snow, ice, and added precipitation.

Since aquatic communities are influenced by water temperature, profiles were taken during the ice-free period. Water temperature peaked at about 75°F during the late summer and early fall periods. Freeze-up occurred during early to mid-November. In general, the water becomes warmer as it flows downstream: the lower stations recorded temperatures approximately 2.5°F warmer than upstream stations.

WILDLIFE

Summary: Wildlife populations in the mine plan area are characteristic of southeastern Montana. Mule deer is the most common big game species, sharp-tailed grouse the most common upland gamebird. The most common wildlife habitat types are ponderosa pine forests and big sagebrush/grassland. This section was based primarily on 1978-80 field surveys (Montco, 1983). New information from the 1981-82 wildlife report, received after publication of the draft EIS, has been added to this document.

Habitat

During field surveys, terrestrial vertebrates in the Montco Mine wildlife study area were found to be a diverse group. (The intensive wildlife study area was approximately the same as the the mine plan area. Aerial surveys extended another four miles outside the perimeter of the mine plan area.) One hundred fifty-five bird, 35 mammal, 7 reptile, and 4 amphibian species were recorded during the surveys. (See appendices 2, 3, and 4 for a species lists and scientific names.) Diversity of the vertebrate species stems from the numbers and kinds of habitats available both within the proposed permit area and throughout the mine plan area. (See Vegetation.) A wildlife habitat type map and a special features map (i.e. rockpiles, cliffs, etc.) are presented in the permit application. Major wildlife habitat types and their corresponding vegetation types are presented in Table III-6.

Big Game

Three big game species were identified as present within the mine plan area--mule deer, pronghorn antelope, and white-tailed deer. Mule deer were most abundant: at one time a total of 336 were counted in the wildlife study area. In addition, Knapp (1977) estimated that there were 4.3 deer per square mile in a region adjacent to and overlapping the mine plan area.

The mine plan area is considered to be late spring, summer, and early fall range for mule deer. Most mule deer leave the mine plan area by mid-November and remain on winter ranges until snowmelt, usually in early spring. Winter range, as identified in the permit application, usually lies east of the mine plan area in breaks habitat within and bordering Custer National Forest. However, mule deer sign has been observed year-round within ponderosa pine/juniper habitat immediately north and south of King Creek. Several travel routes between the uplands and the Tongue River lie within the mine plan area.

Habitat use within the aerial survey area varies with the season. Most summer observations of mule deer occurred within sagebrush/grassland and 3-leaf sumac habitats. Fall sightings were commonly made in big sagebrush/ grassland and coniferous woodlands. Fifty percent of winter habitat sightings were within breaks habitat; most of the remaining observations were in coniferous woodland types. During early spring, habitat use was typical of winter (breaks habitat); in contrast, during late spring, habitat use shifted to the big sagebrush/ grassland, the habitat most commonly used during summer.

A second big game species found on the area was pronghorn antelope. Pronghorns were much less common than mule deer, both in distribution and number. The largest concentrations were seen during the severe winter of 1978-79, when approximately 60 animals were sighted about 0.5 mile north of the proposed North King mining unit. For the most part, during spring and summer, pronghorn in the mine plan area are distributed on benchlands between the Tongue River and the uplands of the Custer National Forest and from the O'Dell Creek area north through King Creek. Spring fawning occurs on these bench areas.

The third big game species seen on the area was white-tailed deer. A minimum of 33 was seen during a February survey. White-tailed deer were usually seen in the riparian and agricultural habitats associated with the Tongue River bottomlands. Few sightings were recorded away from this area; however, some white-tailed deer were seen during spring and summer in woody cover in upland areas.

Gamebirds

Sharp-tailed grouse was the most abundant upland game bird within the area. Most were seen in the sagebrush/grassland habitats (both big and silver sage) and the perennial grassland habitats during spring, summer, and fall. Sightings in the deciduous and conifer wooded types increased during fall and peaked during winter. Six dancing grounds were found on the wildlife study area, three of which lay within or bordering the mine plan area. In 1980, most of the grounds contained an average of 10-14 dancing males; the largest ground contained 20 active males. An additional dancing ground, noted in 1982, may be forming near upper O'Dell Creek, just outside the mine plan area.

Another upland game species found in the study area was the ring-necked pheasant, which was most often sighted in bottomlands along the Tongue River. Less frequently this species was seen on a brushy draw and hillside north of King Creek, O'Dell Creek, and Poker Jim Creek. Its winter distribution was more restricted, centering mostly in riparian and agricultural habitats along the Tongue River.

Other upland gamebirds recorded during the wildlife study were gray partridge, sage grouse, and wild turkey. Partridge and grouse were only occasionally observed. A small population of turkeys inhabits pine forests east of the mine plan area.

Resident waterfowl populations were restricted to stockponds within the mine plan area and the part of the Tongue River adjacent to the mine plan area. Five Canada goose broods were documented on the Tongue River; a brood of eight blue-winged teal was counted on the Cedar Creek stockpond. In addition, three Merganser broods were seen on the river. Waterfowl densities peaked during the spring and fall migration periods.

Raptors

Twenty-one species of eagles, hawks, vultures, and owls were observed on the study area. These varied from year-round residents, such as golden eagles and great horned owls; to summer residents, such as Coopers hawks, prairie falcons, and turkey vultures; to winter residents, such as rough-legged hawks; to spring and fall migrants, such as osprey. Seven red-tailed hawk nests and two great-horned-owl nests were located along the Tongue River. Another red-tail pair nests near the southern boundary of the proposed permit area. An active prairie falcon nest was discovered about 1 mile east of the mine plan area (Pat Farmer, Westech, personal commun., January 11 and 13, 1984).

Threatened and Endangered Species

Two threatened or endangered species were observed in the study area. On March 23, 1979, a positive sighting of a peregrine falcon was recorded near the mouth of King Creek. A subsequent intensive search for peregrines found that no birds were nesting in the area; however, the survey did indicate that good foraging habitat was present. Although many adequate nesting cliffs were located, none of the optimum sites were within the mine plan area.

Bald eagles were also sighted, usually along the Tongue River, from fall through spring. The bald eagles were most commonly seen during periods of ice-free river conditions. Lockhart et al. (1978) identified the Tongue River immediately below the Tongue River Dam as an important winter concentration area, because it does not freeze over. Carrion is the major food source.

No black-footed ferrets or their sign were encountered during searches of prairie dog towns. Searches would be conducted the year before mining.

Small Mammals

Trap lines were used to assess density and occurrence of small mammals. Table II-14 presents some of the common species captured and their relative densities. The deer mouse was the most common trapped mammal in the Montco study area in a variety of habitats.

TABLE II-14

Relative Abundance of Eight Species of Small Mammals, Expressed as Percent of Captures

Species	Fall 1979		Spring 1980	
	Number	Percent	Number	Percent
Deer mouse	121	85.2	70	88.6
White-footed mouse	5	3.5	1	1.3
Western harvest mouse	1	0.7	5	6.3
Least chipmunk	12	8.5	2	2.5
Prairie vole	1	0.7	0	0
Ord kangaroo rat	1	0.7	0	0
Olive-backed pocket mouse	1	0.7	0	0
13-lined ground squirrel	0	0	1	1.3
TOTAL	142	100.0	79	100.0

Source: Montco, 1983.

Miscellaneous observations were used to document the presence of other mammals. Included in these sightings were prairie dogs, red squirrels, pocket gophers, white-tailed jack rabbits, and porcupines.

Nongame Birds

Resident nongame birds were inventoried by several methods. Since differing habitats contain both different species and densities, a sample of the monitoring study results is presented in table II-15. The habitats sampled varied from riparian to ponderosa pine/juniper and big/sage grassland. Average number sighted per transect is also presented.

CLIMATE

Summary: The semiarid climate at the site of the Montco Mine is typical of the Northern Powder River Basin: moisture is insufficient to support dense vegetative growth (Critchfield, 1966). Precipitation is low but variable, falling primarily during April through June. Diurnal and seasonal temperatures range widely. Surface humidity is low. Prevailing winds blow from the southwest and northeast, along the Tongue River Valley, and wind speeds are moderate, rarely calm. A regional EIS prepared by the U.S. Department of Interior and DSL (1980) describes the climate in greater detail.

TABLE II-15

Common Birds Seen on Vehicle, Point, and
Belt Transects, Montco Wildlife Study Area,
May and June 1980

Species	Average No. Observed
Vehicle Route Transect	
Western meadowlark	160.3
Brewer's blackbird	100.7
lark sparrow	48.3
lark bunting	45.7
Brewer's sparrow	21.3
mourning dove	20.7
robin	19.0
yellow warbler	12.7
vesper sparrow	10.3
King Creek - Ponderosa Pine/Juniper	
chipping sparrow	21.7
lark sparrow	15.0
yellow-rumped warbler	8.0
rufous-sided towhee	7.0
Western kingbird	6.7
brown-headed cowbird	5.0
robin	3.3
house wren	3.3
mourning dove	2.3
Dry Creek - Ponderosa Pine/Juniper	
chipping sparrow	26.3
lark sparrow	13.7
Western meadowlark	10.0
yellow-rumped warbler	7.0
brown-headed cowbird	5.7
rufous-sided towhee	5.3
Western kingbird	4.7
Western wood peewee	4.7
mourning dove	3.0
house wren	3.0

Species	Average No. Observed
McKelvey-King Creek Riparian	
mourning dove	22.0
common grackle	19.0
house wren	17.3
yellow warbler	17.0
American robin	10.7
Western kingbird	10.7
tree swallow	9.0
yellow-breasted chat	6.3
red-winged blackbird	5.7
least flycatcher	4.7
N. O'Dell Creek Big Sagebrush/Grassland	
Brewer's sparrow	17.67
meadowlark	6.00
lark sparrow	9.67
vesper sparrow	1.00
mourning dove	0.34
rufous-sided towhee	1.00
common flicker	0.34
American goldfinch	0.67
sharp-tailed grouse	1.34
N. King Creek - Big Sage/Grassland	
Brewer's sparrow	8.00
lark sparrow	3.67
meadowlark	4.00
sharp-tailed grouse	0.34
vesper sparrow	1.67
Western kingbird	0.34
chipping sparrow	1.34
mountain bluebird	0.34
common flicker	0.34

Source: Montco, 1983.

Note: Each transect was traveled three times.

Meteorological data were collected for this EIS at a meteorological site on the proposed Montco Mine site (fig. II-4) for one year, August 1979 through July 1980 (fig. II-5). This period is too brief to fully characterize the climate. Thus, data collected at Birney, 15 miles southwest, are used instead, unless otherwise noted.

Precipitation

During the 25-year period of 1955-1979, mean annual precipitation at Birney was 13.2 inches, ranging from 5.8 to 19.8 inches. Over 60 percent of this falls from May through September, the potential growing season. Winters are relatively dry (fig. II-5). Much of the annual precipitation, especially during June, falls in brief, intense thunderstorms (table II-16).

Effective precipitation, that is, water available for plant growth, soil formation, and erosion (Thornthwaite, 1937), is greatest in spring and early summer (fig. II-5).

On each of at least 90 days a year at least 0.01 inches of precipitation fall, an amount sufficient to control fugitive dust emissions during that day (U.S. Environmental Protection Agency (EPA), 1975).

Temperature

Mean annual temperature is about 44.5° F. During the monitoring period the Montco site had an average temperature of 47° F, warmer during almost all months than Birney (fig. II-5). The freeze-free period, the period temperatures remain above 32° F, was 151 days at Montco, probably longer than normal (Toy and Munson, 1978). The growing season, however, is effectively terminated during mid to late summer, due to drought-induced dormancy of vegetation. (Toy and Munson, 1978).

Winds

Winds generally blow from the southwest or northeast along the Tongue River Valley. Wind direction shows little seasonal variation or cross-valley channeling, but it does show a distinct day/night distribution. During the night, winds blew from the south-southwest to west-southwest 68 percent of the time and during the day only 25 percent of the time.

The average wind speed measured at the Montco minesite was 7.2 mph. Winds above 24 mph occurred less than one percent of the time; calm periods occurred about one percent of the time. Average wind speeds were greatest during the day (8.8 mph at 3 p.m.) and lowest during the night (6.3 mph at 1 a.m.).

Atmospheric Stability

Atmospheric stability is a measure of vertical air motion. The data for the annual period (fig. II-6) indicate that stable atmospheric conditions

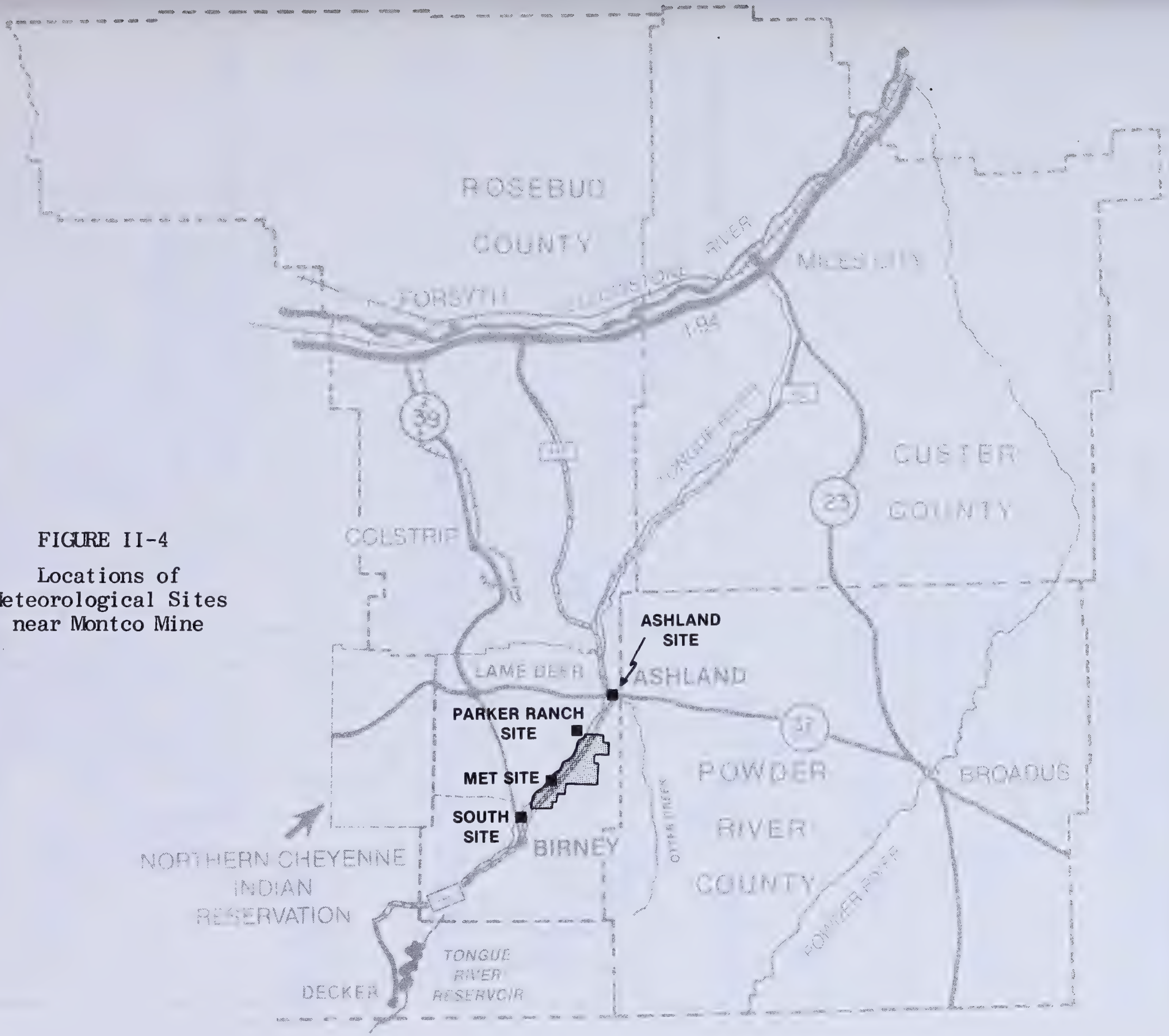

FIGURE II-4

Locations of Meteorological Sites near Montco Mine

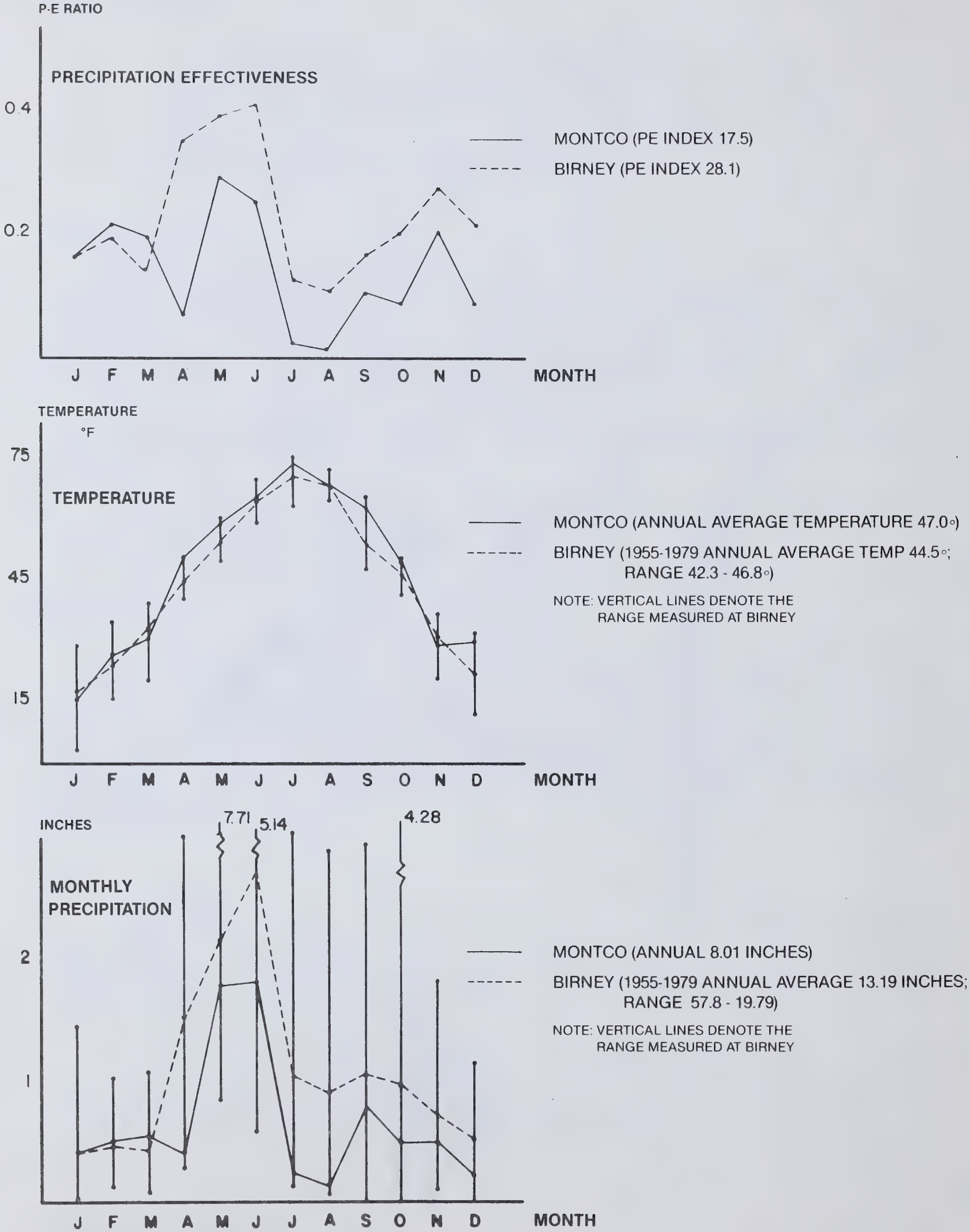

FIGURE II-5
Climatic Data for Montco Mine and Town of Birney

TABLE II-16

Maximum Amount of Precipitation Expected at the Montco Site During Various Time Intervals

Length of Event (hours)	Number of Years Considered 2	5	10	25	50	100
	Amount of Precipitation (Inches)					
1	0.7	0.9	1.2	1.4	1.7	1.9
6	1.0	1.3	1.5	2.0	2.2	2.4
24	1.4	1.8	2.2	2.8	3.0	3.4

Source: Miller et al., 1973

occurred about 49 percent of the time; neutral conditions 29 percent of the time; and unstable conditions about 22 percent of the time. These unstable conditions, which enhance dilution and dispersion of air pollutants, are most frequent in the summer, occurring 30 percent of the time, and least frequent in the winter, occurring 9 percent of the time.

Persistence of stable atmospheric conditions worsens potential pollution episodes by slowing dispersion of air pollutants. Stable conditions persisted for more than 10 hours only 25 percent of the time and for more than 18 hours only 0.2 percent of the time. Therefore conditions are favorable for pollution dispersion and dilution.

AIR QUALITY

Summary: Air quality in most of the Montco study area (fig. II-4) is very good. The annual average and the 24-hour maximum total suspended particulate (TSP) concentrations are well below Federal and Montana ambient air quality standards (AAQS; see table II-17), and are similar to other undisturbed areas in southeastern Montana (U.S., Department of Interior and Montana Department of State Lands, 1980). Moreover, although other pollutants were not measured, they, too, are probably very low because no major sources of pollutants exist nearby. On the other hand, ambient air quality standards for TSP were exceeded at the Ashland site, indicating a potential, localized pollution problem.

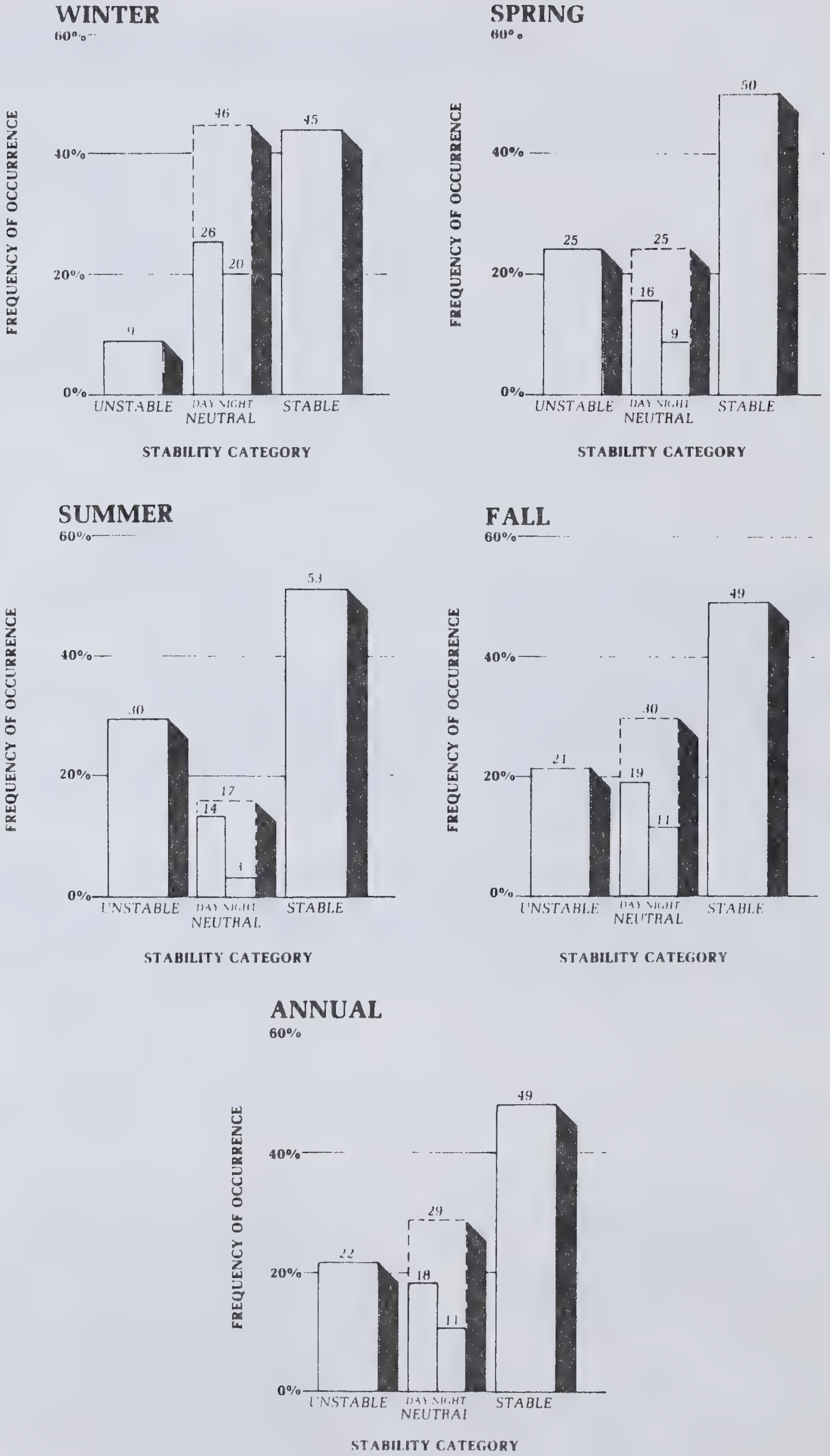

FIGURE II-6

Atmospheric Stability at Various Monitoring Sites

TABLE II-17

Ambient Air Quality Standards (AAQS)

Pollutant	Averaging Time	Montana	Federal Primary[a]	Federal Secondary[a]
Total Suspended Particulate	Annual	75ug/m^3[b]	75ug/m^3[c]	60ug/m^3[c]
	24 Hours	200ug/m^3[d]	260ug/m^3	150ug/m^3[c]
Sulfur Dioxide	1 Hours	0.50ppm[e]	---[h]	---
	3 Hours	---	---	0.5ppm
	24 Hours	0.10ppm[d]	0.14ppm	---
	Annual	0.02ppm[f]	0.03ppm[f]	---
Carbon Monoxide	1 Hours	23ppm[f]	35ppm	35ppm
	8 Hours	9ppm[f]	9ppm	9ppm
Lead	90 Days	1.5ug/m^3[f]	1.5ug/m^3	1.5ug/m^3
Nitrogen Dioxide	1 Hour	0.30ppm[d]		
	Annual	0.05ppm[f]	0.05ppm[f]	0.05ppm[f]
Settled Particulate	30 Days	10g/m^2[f]	---	---
Nonmethane Hydrocarbons[g]	3 Hours (6-9 a.m.)	---	0.24ppm	0.24ppm
Photochemical Oxidants (ozone)	1 Hour	0.10ppm[d]	0.12ppm	0.12ppm

[a] Federal ambient air quality standards with averaging time less than 1 year are not to be exceeded more than once per year.

[b] Arithmetic average; not exceeded.

[c] Geometric mean; not to be exceeded.

[d] Not to be exceeded more than once per year.

[e] Not to be exceeded more than 18 times in any 12 consecutive months.

[f] Not to be exceeded.

[g] Set as a guide to achieve photochemical oxidant standards.

[h] ---indicates no standard.

Northern Cheyenne Indian Reservation

TSP concentrations on the Northern Cheyenne Indian Reservation, just west of the Tongue River (fig. II-4), are similarly indicative of good air quality. The Montana Air Quality Bureau monitored TSP concentrations at Fisher Butte, 10 miles northeast of the Montco Met site, elevation 4,396 feet, from January 1978 to December 1979. The bureau found the annual mean TSP concentration to be 16.8 $\underline{ug/m^3}$, the maximum 24-hour concentration, 143 $\underline{ug/m^3}$. The lowest concentrations were measured during winter. The Parker Ranch site, located much closer to the proposed permit boundary (fig. II-4), also showed very low TSP concentrations (table II-18).

The Reservation is a Class I air quality area. Accordingly, to prevent significant deterioration of air quality, Federal regulation (40 CFR 52.21) allows little increase in TSP and SO_2 (sulfur dioxide) concentrations. The increases, or "increments," that are allowed are listed in table II-19. Increment consumption applies only to major stationary sources or minor sources where the baseline has been triggered by a previous application. Since Montco's operation is not classified as a major source and, due to changes in the regulations, it is unclear as to whether Montco's operation would consume the increment on the reservation.

Ashland Monitoring Site

Poor air quality in Ashland is indicated by TSP concentrations exceeding the Montana AAQS for both the annual average and 24-hour maximum (table II-18). The single largest contributor to this is probably fugitive dust from traffic on unpaved roads throughout the area. Reentrainment of fugitive dust from U.S. Route 212 also adds to the TSP levels.

The Northern Cheyenne Forest Products sawmill, at the western edge of Ashland, is the only major point source of pollutants in the area. The Montana Air Quality Bureau (MAQB) estimates that the plant annually emits 645 tons of carbon monoxide, 125 tons of particulate, 60 tons of hydrocarbons, 38 tons of nitrogen oxides, and five tons of sulfur dioxide. Nonetheless, this meets MAQB regulations (Harry Keltz, MAQB, written commun., November 4, 1981).

No other source contributes as much pollution to Ashland. Space heating with coal and wood emits similar pollutants to those of the sawmill, but at much lower rates and only during the colder months. Production at Coal Creek Coal Mine, east of Ashland, is too low to affect the air quality.

Other Monitoring Sites

The Met and South monitoring sites are located in rural open areas away from any major sources of pollution. Their TSP concentrations reflect the area's pristine air quality (table II-18): the annual average TSP was 24 u/m^3; the maximum 24-hour TSP concentration, 91 u/m^3. The only major particulate emission is traffic on unpaved roads. The lowest TSP concentration occurred at all sites from November through March (fig. II-7), when snow cover and frozen surfaces probably reduced emissions.

TABLE II-18

Total Suspended Particulate Concentrations (August 1979 through July 1980); Montco Study Area (ug/m^3)

Site	No. Samples	Arithmetic Mean	Geometric Mean	Max.[2] 1st	Max. 2nd	Max. 3rd
Met	71	24.5	19.9	70.0	57.6	55.8
South	66	23.2	19.0	91.3	57.4	43.7
Parker Ranch	70	22.0	17.6	67.1	64.3	53.0
Ashland	69	95.0	76.4	238.5	215.4	198.0
Fisher Butte[1]	66	16.8	9.9	143.0	56.0	47.0

[1] Monitoring period was January 1978 to December 1979

[2] Max. 1st means the highest 24-hour concentration measured.
Max. 2nd means the second highest 24-hour concentration measured.
Max. 3rd means the third highest 24-hour concentration measured.

The area surrounding the proposed permit area and the Northern Cheyenne Indian Reservation is a Class II air quality area. Federal regulations allow a greater increase in TSP and SO_2 concentrations here than in a Class I area (table II-19). Still, Ambient Air Quality Standards (table II-17) cannot, by law, be exceeded.

Concentrations of arsenic, lead, cadmium, and other trace elements in rural areas such as the study area are extremely low (U.S. Environmental Protection Agency, 1976; Gelhaus, 1976).

Visibility

Annual average visibility in the study area is about 100 miles, with seasonal averages ranging from 81 miles in spring to 109 miles in summer.

EMPLOYMENT AND INCOME

Summary: The study region--Rosebud, Powder River, and Custer Counties--includes economies that differ substantially. Rosebud County's economy is based on energy development, construction, and agriculture; Powder River County's economy, on agriculture and declining oil development; and Custer County's economy, on Miles City's position as the agricultural region's trade center.

TABLE II-19

PSD Concentrations Increments

Pollutant	Increment (ug/m^3)
Class I Areas	
Particulate Matter	
Annual geometric mean	5
24-hour maximum	10
Sulfur Dioxide	
Annual arithmetic mean	2
24-hour maximum	5
3-hour maximum	25
Class II Areas	
Particulate Matter	
Annual geometric mean	19
24-hour maximum	37
Sulfur Dioxide	
Annual arithmetic mean	20
24-hour maximum	91
3-hour maximum	512
Class III Areas	
Particulate Matter	
Annual geometric mean	37
24-hour maximum	75
Sulfur Dioxide	
Annual arithmetic mean	40
24-hour maximum	182
3-hour maximum	700

Note: For any period other than the annual, the applicable maximum allowable increase may be exceeded during one such period per year at any one location.

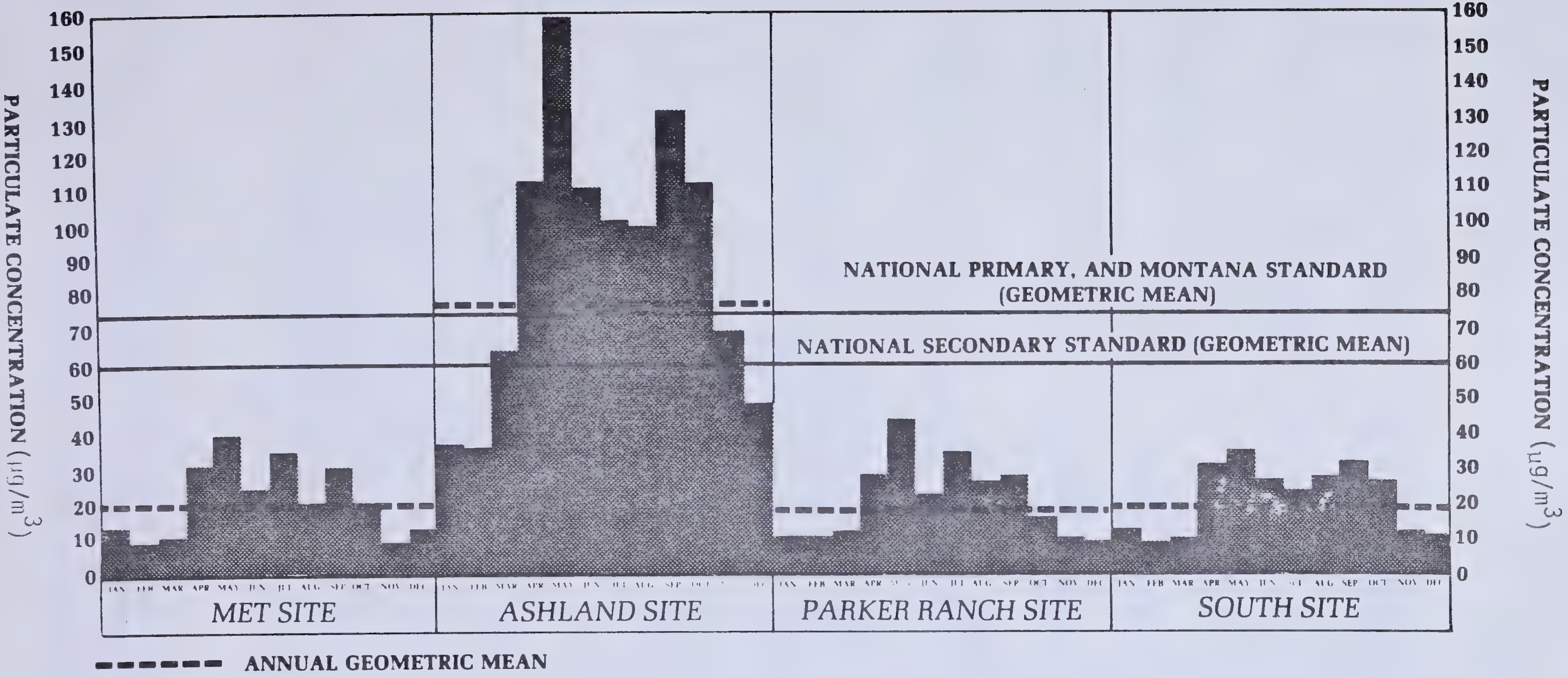

FIGURE II-7

Monthlog Arithmetic and Annual Geometric Means
of Total Suspended Particulates
August 1979 - July 1980

Region

The major communities in the study region include Miles City, a trade and government center for a wide area in eastern Montana; Forsyth, the Rosebud County seat; Colstrip, a company-owned town where the region's most intensive energy development is located; and Broadus, the Powder River County seat. The greater portion of the Northern Cheyenne Indian Reservation is also located in the study region. The nearest community to the proposed Montco mine is the small, unincorporated town of Ashland in Rosebud County.

(Unless otherwise noted, this section is derived from the 1981 report by Mountain West Research, Inc., on the proposed Montco Mine. See appendix 6 for details on the model used by Mountain West Research.)

Although regional employment decreased slightly between 1950 and 1970, it grew 51 percent by 1980, to 11,994 workers. The increase was led by mining and construction employment in Rosebud County.

Sector by sector, employment changed in the following way between 1950 and 1980. Agricultural employment decreased 38 percent, mostly during the 1950s. Mining employment increased twelve-fold in the 1970s. Construction employment declined from 1950 to 1970, but then added more than any other sector to regional employment in the 1970s with the construction of the first two units of the Colstrip generating station. Manufacturing employment grew 60 percent between 1950 and 1970, but then declined slightly during the 1970s. Employment in the transportation, and utilities (TU) industrial sector fell 57 percent between 1950 and 1970, but then grew 44 percent by 1980 (due largely to utilities employment at the Colstrip generating station in Rosebud County). Tertiary sector employment, including finance, insurance, and real estate (FIRE), trade, services, and nonfarm proprietors, steadily increased during the entire period. Government employment grew 45 percent between 1950 and 1970 and 244 percent between 1970 and 1980.

The increase in employment from 1970 to 1980 was accompanied by an increase in the region's gross employment participation rate, from 42 to 48 percent, a rate faster than that for the nation. Not surprisingly, the region's unemployment rate has been consistently below that for Montana.

Adjusted for inflation, per capita income grew at an annual rate of 2.1 percent during the 1970s. Unadjusted for inflation per capita income peaked in 1975, along with construction of Colstrip Units 1 and 2. (See table II-20.) As a part of total personal income, earned income decreased from 78 percent of total in 1970 to 75 percent in 1979; dividends, interest, and rent increased from 16 percent to 19 percent; and transfer payments also increased slightly.

Rosebud County

Since 1970 energy development has changed the fundamental structure of Rosebud County's economy. Rosebud County is the site of Western Energy's Rosebud Mine, Colstrip Generating Units 1 and 2, Peabody's Big Sky Mine, and coal-related railroad employment in Forsyth. As a result, mining employment

TABLE II-20

Components of Total Personal Income
Montco Study Region, 1970, 1975 and 1979
(thousands of 1972 dollars)

	1970		1975		1979	
Components of total personal income	Amount	Percent	Amount	Percent	Amount	Percent
Labor and proprietor's income by place of employment	$57,903	78.0	$89,362	86.5	$84,638	74.5
Less: personal contrib. for social insurance	2,707	-3.6	5,004	-4.8	5,536	-4.9
Plus: dividends, interest, and rent	11,586	15.6	15,043	14.6	21,374	18.8
Plus: transfer payments	7,985	10.8	11,300	10.9	13,470	11.9
Plus: residence adjustment	-508	-0.7	-7405	-7.2	-340	-0.3
Total personal income	$74,260	100.0	$103,296	100.0	$113,606	100.0
Per capita income (1972 dollars)	$3,549		$4,424		$4,235	

Source: Mountain West Research, Inc., November 1981, p. 3-14.

during the 1970s grew from 43 to 473 workers and TU employment from 151 to 480 workers. The construction of Colstrip Units 3 and 4 began in earnest in 1980 and brought employment there to 1,121. Over the decade the share of mining and TU employment rose from 9 percent of the total workforce to 14.5 percent.

This energy development spurred the remainder of Rosebud County's economy: government employment increased 58 percent between 1970 and 1979; the share of employment held by the trade, FIRE, and service employment increased 40 percent from 25 to 35 percent of the total. (See table II-21.) Moreover, nonenergy construction, trade, FIRE, services, nonfarm proprietors, and government sectors rose from 55 percent of all workers in 1970 to 67 percent in 1979.

Over the same period, agricultural employment steadily declined, as it has for more than four decades. The decline between 1950 and 1970 was offset by increases in manufacturing (mainly sawmills) and services (mainly associated with the Northern Cheyenne Indian Reservation). Total employment thus remained about the same.

During the 1970s the gross labor force participation rate grew from 45 to 47 percent. (See table II-22.) This caused the total labor force to increase faster than total employment. Consequently, although the unemployment rate fluctuated at slightly above three percent between 1970 and 1975, since then it has remained above 5 percent.

The gross labor force participation rate for Indians was different. In 1980 it was 28 percent; that for non-Indians was 52 percent. Much of the the difference can be explained by the larger percentage of persons under 18 years of age for the Indian population, boding a large future increase in the Indian labor force as that population ages.

TABLE II-21

Employment by Broad Industry in Rosebud County, 1970-79

	1970[a]	1971[a]	1972[a]	1973[a]	1974[a]	1975[b]	1976[b]	1977[b]	1978[b]	1979[b]
Agriculture[1]	704	710	696	681	692	658	649	596	577	617
Mining	43	79	104	269	283	392	416	403	426	393
Construction	29	25	39	76	180	1,354	656	345	267	282
Manufacturing	214	230	265	192	180	160	146	52	81	222
T.U.[2]	184	181	192	193	212	210	226	241	239	253
Trade	216	242	269	312	346	411	425	367	400	432
F.I.R.E.[3]	19	26	37	43	49	50	61	61	59	65
Services	391	520	569	727	827	809	905	1,002	1,108	1,051
Nonfarm Proprietors	228	233	215	233	275	338	344	367	366	369
Federal Government	159	162	173	174	204	226	205	201	209	216
State & Local Government	330	353	367	393	419	441	455	480	530	557
TOTAL	2,517	2,761	2,926	3,293	3,667	5,049	4,488	4,115	4,262	4,457

Source: U.S. Department of Commerce, 1981.

[a] Estimates based on 1967 standard industrial codes (S.I.C.).

[b] Estimates based on 1972 standard industrial codes (S.I.C.).

[1] Includes farm proprietors, farm wage and salary employment, agricultural services, forestry, fisheries and other.

[2] Transportation and public utilities.

[3] Finance, insurance, and real estate.

As the employment pattern has changed in Rosebud County, so has the composition of total personal income. Labor and proprietor's income, the largest component of personal income in 1970, grew faster than, and thus increased its relative position to, other elements: lead by increases in wages and salaries in the mining and TU industries, it nearly tripled between 1970 and 1979, from \$13.2 to \$51.8 million. Likewise, since personal income grew faster than population, per capita income in constant dollars also jumped, from \$2,992 in 1970 to \$3,905 in 1979.

Retail trade is commonly ranked by orders of purchases. First-order purchases are everyday items, such as groceries and gasoline. Second-order purchases are higher priced items, such as household appliances and furniture. Forsyth is the county's major trade center and is the site for both first-order and most second-order purchases from the area north of Colstrip. In the southern part of the county Colstrip, Lame Deer, and Ashland are minor trade centers that capture first-order purchases. Second-order and higher purchases leak to Billings, Hardin and Sheridan, Wyoming.

TABLE II-22

Labor Force, Employment, Gross Labor Force Participation Rate and Unemployment in Rosebud County, 1970-80

Year	Labor Force	Total Employment	Participation Rate	Total Unemployment	Unemployment Rate
1970[a]	2,690	2,606	0.45	84	3.1
1971[a]	2,738	2,657	0.44	81	3.0
1972	2,662	2,577	0.38	85	3.2
1973	3,155	3,055	0.39	100	3.2
1974	3,238	3,120	0.33	118	3.6
1975	5,100	4,931	0.48	169	3.3
1976	4,495	4,236	0.48	259	5.8
1977	3,942	3,671	0.45	271	6.9
1978	4,512	4,248	0.50	264	5.9
1979	4,577	4,346	0.46	231	5.0
1980	5,305	5,021	0.47	284	5.4

Source: Mountain West Research, Inc., November 1981, pp. 3-77 and 3-61.

[a] Based on number of jobs at place of work; subsequent data are based on number of workers at place of residence. Consequently, these data are not in exact agreement with the data in the preceeding table provided by the Department of Commerce, which measures employment by place of work.

Powder River County

Since 1950, agricultural employment in Powder River County has declined by 308 jobs, dropping from 71 to 42 percent of total employment. As a result, total employment fell in the 1950s. In contrast, total employment grew rapidly during the 1960s and modestly during the 1970s, spurred by the development of the Belle Creek oil field located in southeastern Powder River County.

By sector during the 1970s, government employment grew to 264 workers. Mining, construction and TU, all related to initial oil field development, declined. Service sector employment, including trade, FIRE, services, and nonfarm proprietors, grew slowly--these plus government accounted for 30 percent of total employment in 1970, 49 percent in 1980.

These developments since 1950 have concentrated the county's employment in Broadus, the county seat and trade center. Even so, Broadus captures only first-order purchases by Powder River County residents. Higher order purchases leak to Miles City, Belle Fourche and Rapid City, South Dakota, and Gillette, Wyoming.

Total personal income in constant dollars grew an average 1.9 percent between 1970 and 1979. (See table II-23.) Because of population decline, per capita income grew even faster, an average of 3.4 percent, rising from $3,232 in 1970 to $4,385 in 1979. Of total income, labor and proprietor's income fell from 81 percent in 1970 to 65 percent in 1979. Therefore, most income growth was generated by transfer payments dividends, interest, and rent (which includes royalties from oil production).

TABLE II-23

Components of Total Personal Income
Powder River County, 1970, 1975 and 1979
(thousands of 1972 dollars)

	1970		1975		1979	
Components of total personal income	Amount	Percent	Amount	Percent	Amount	Percent
Labor and proprietor's income by place of employment	$7,438	81.3	$5,486	65.8	$7,098	65.3
Less: personal contrib. for social insurance	-199	-2.2	236	-2.8	323	-3.0
Plus: dividends, interest, and rent	1,024	11.2	1,599	19.2	2,072	19.1
Plus: transfer payments	650	7.1	869	10.4	1,010	9.3
Plus: residence adjustment	-234	-2.6	622	-7.5	1,014	-9.3
Total personal income	$9,147	100.0	8,340	100.0	$10,871	100.0
Per capita income (1972 dollars)	$3,232		$3,488		$4,385	

Source: Mountain West Research, Inc., November 1981, p. 3-168.

Custer County

Long-term county employment trends show a decline in agriculture, mining, construction, and TU employment; relatively stable manufacturing employment; and growing service sector or tertiary employment. The proportion of jobs in agriculture, mining, construction, manufacturing, and TU declined from nearly half to less than a quarter of total employment from 1950 to 1980. Government employment grew from five percent of the total in 1950 to 22 percent in 1980. Other tertiary sectors grew from 46 percent in 1950 to 54 percent in 1980. Total employment grew by 18 percent from 1950 to 1980, an annual rate of 0.6 percent.

The greatest growth in employment in the 1970s was in services, trade, nonfarm proprietors, and construction, with combined increases of nearly 1,400 jobs. In contrast, mining employment declined by 68 jobs, farm proprietors by 63, and farm wage and salary workers by 18.

In real terms, Custer County's per capita income grew 2.7 percent annually during the 1970s, growing most in the first half of the decade. Toal personal income grew 3.8 percent annually, growing most in the second half of the decade. Of the total growth rate, earned income climbed 2.7 percent annually, considerably less than that for total income. Thus, the more important causes of growth in total income were dividends, interest, and rent (increasing 7.7 percent annually) and transfer payments (increasing 6.7 percent annually). These two income components grew from 27 percent of total personal income in 1970 to 34 percent in 1979. In contrast, labor and proprietor's income fell from 77 percent of the total in 1970 to 71 percent in 1979.

Miles City, the county seat, is a second-order trade, government, education, and health services center serving a large area of eastern Montana. Its economic future is largely dependent on the outlook for its trade area, a stabilized agricultural economy. Recently, Glendive has become a more important competitor as a trade center, and Billings has started to become a competitor as a wholesaling center. Nonetheless, coal development in Rosebud County and scattered oil exploration in Miles City's trade area will replace these trade losses.

Northern Cheyenne Indian Reservation

The reservation economy is based on jobs provided by the tribal government and Federal programs (Northern Cheyenne Planning Office [NCPO], July 1981, p.2). There has been a slow shift from a subsistence to a cash economy, but most households still rely on hunting and gathering to supplement their incomes (NCPO, August 1981, p. 91). As at most reservations in Montana, chronic unemployment is a serious problem.

Fifty-seven percent of the 27 respondents to a recent survey in the Birney District were unemployed (NCPO, August 1981, p.11); few had technical or specialized job training; and only five were actively seeking employment. Half of the district's households live on less than $5,000 per year; 57 percent supplement their incomes by hunting, gathering, fishing and gardening.

Unemployment in the Ashland District was not as bad, but was still a serious problem, standing at 31 percent (NCPO, August 1981, p. 113-114). The average household income is about $10,000, but 43 percent of the households earn less than $5,000 per year and 84 percent supplement their income by traditional hunting and gathering activities.

SOCIOLOGY

Summary: Rosebud, Powder River, and Custer Counties make up the social study area for demography. (See fig. I-1.) Over the next three decades, Rosebud County will grow the most if no new mines are built; Powder River County will lose population; and Custer County's population will increase slightly.

The study area for social organization, shown as the sociology study area on figure II-8, includes and is referred to in this text as the Ashland-Birney area.

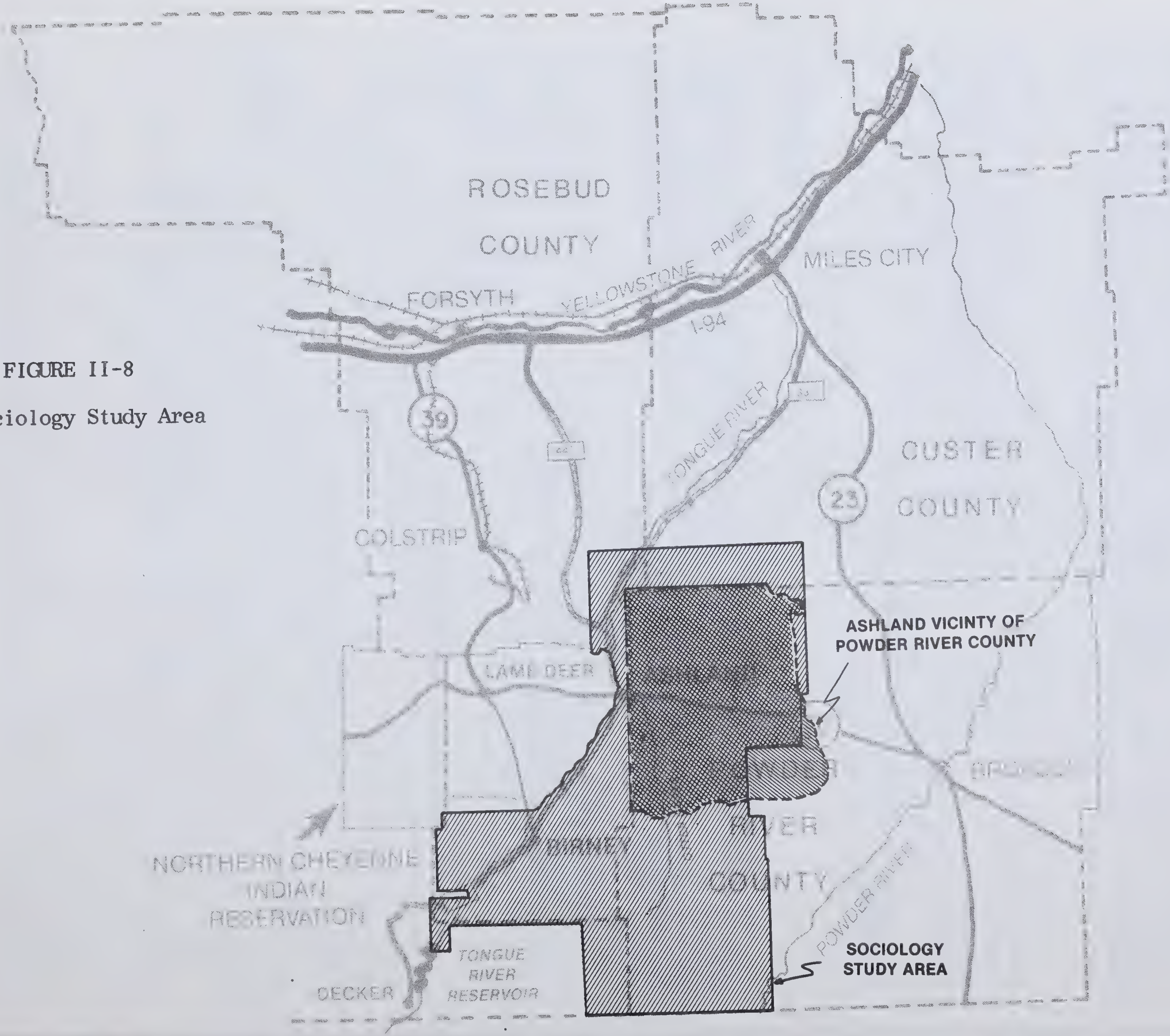

FIGURE II-8

Sociology Study Area

The Ashland and Birney communities are closely tied to the larger society economically, and to a lesser degree politically and socially. There is substantial inequality in the economic resources and social esteem given to individual Ashland residents; this stratification is less apparent in Birney. The Ashland community is differentiated into numerous small social groups that exhibit little community-level coordination. The Birney community, on the other hand, is more homogenous. In both communities most people feel they have a voice in decisions regarding their communities. The Ashland community is not well integrated; Birney, however, appears to be. Family life is important in both communities and among the Northern Cheyenne.

The Northern Cheyenne are a culturally distinct population located near the proposed mine. Despite the proximity of Northern Cheyenne settlements to Ashland and Birney, the Northern Cheyenne form separate communities.

People in the Ashland-Birney area see advantages and disadvantages to coal mining. In a Department of State Lands (DSL) survey, employment was most frequently mentioned as a likely benefit of mining; population influx was most often given as the main disadvantage.

Methodology

To gain information on the Ashland and Birney communities and the residents concerns regarding coal development the Department of State Lands conducted a telephone survey in the Ashland-Birney area in July and August of 1981. Eighty-five persons were interviewed. There were 332 households with listed telephone numbers in this area; those interviewed were selected by a systematic random sample. The person interviewed in each household was determined by a method that gave each adult an equal chance of being selected. Two persons selected chose not to be interviewed.

The Department of State Lands also conducted 36 personal interviews with persons in the Ashland-Birney area in 1981. The persons interviewed were selected on the basis of their reported knowledge of their communities. These people are referred to here as informants; they included ranchers, business proprietors, retired persons, and persons employed by the Federal government, the St. Labre Mission and School, the Ashland Public School, and the sawmill.

The Northern Cheyenne Planning Office conducted a household survey on the reservation in 1981. Five hundred sixty-three household, or 80 percent, responded. One hundred percent of the households in both the Ashland and the Birney reservation districts were interviewed. The survey results that concern the Northern Cheyenne are from this study.

Former Energy Development

Rosebud, Powder River and Custer Counties differ in their experience with energy development and the population influx it brings. Rosebud County has experienced the greatest influx of newcomers as a result of construction at Colstrip. Western Energy Company resumed production at the Rosebud Mine in 1968 and has expanded production since. Peabody Coal Company began mining coal in Rosebud County in 1969. Colstrip generating Units 1 and 2 were built between 1972 and 1976. Units 3 and 4 are currently under construction. Forsyth, the only incorporated town in the county, experienced increased population as a spillover effect from these same activities.

Ashland and Birney have had limited experience with energy development. Seventy-nine percent of those surveyed stated they knew either a little, or not much at all, about coal mining. Only 7 percent of those surveyed had worked in a coal mine in the region. A few Colstrip workers live in Ashland. A small coal mine used to operate just 5 miles to the north of Ashland. This mine employed 15 to 24 people, depending on sales. Ashland's population fluctuates somewhat as a result of workforce changes at the local sawmill. No other energy development exists in the Ashland-Birney area. Many members of these communities, however, have become knowledgeable about mining and some of its potential consequences through their observation of mining in nearby areas. The Birney community split over the coal development issue about ten years ago, according to informants interviewed; some feel the tension is lessening.

Powder River County experienced a significant population increase--and decrease in the 1960's--owing to oil and gas exploration. Custer County has not experienced population growth as a direct result of energy development, but Miles City has benefited from increased trade generated by energy workers in Rosebud and Powder River Counties.

Demography

The population figures below are for Rosebud, Powder River and Custer Counties. They represent the growth that is forecast to occur even if no new mines are added to the study area. (See figures III-6, III-7, III-8, and III-9.) These projections were made by Mountain West Research Inc. (Nov., 1981).

Region

Rosebud, Powder River, and Custer Counties adjoin one another in southeastern Montana. (See fig. S-1.) Billings, Montana, the closest metropolitan area, is located 100 miles west of Forsyth; Ashland is 78 miles, and Birney 108 miles south of Forsyth. Miles City is the only incorporated town in Custer County, lying 145 miles northeast of Billings. Broadus, the only incorporated town in Powder River County, lies 168 miles southeast of Billings.

Of the three counties, Rosebud County's population will grow the most in the years ahead if no new mines are added to the area. This growth is due to (1) employment created by the construction of Colstrip Units 3 and 4 and (2) a natural increase of the Northern Cheyenne Indian population (Mountain West Research, Inc., 1981, p. 4-19).

Rosebud County's 1980 population was 11,278 persons, or a density of about two people per square mile. (See fig. III-6.) Without Forsyth's population (the county's only incorporated city) the density was 1.5 persons per square mile. During construction of units 3 and 4, total population will grow 43 percent, to 16,166 persons by 1983, then drop 28 percent, to 11,573 by 1986. Between 1986 and 2010 the county will grow 5.4 percent, to 12,199. Although out-migration related to employment will lower the population by 973 persons, more births than deaths will result in a population increase.

Ashland and Birney

The 1980 population of the Ashland area was 431 persons, or 4 percent of Rosebud County's population. The population will increase to 528 by 1985, reflecting Colstrip construction activity and anticipated expansion of the wood products industry. After 1985, the population will slowly decline to 459 by 2010, 6 percent above the 1980 figure.

The 1980 population of Birney was 136 persons. The area's population will gradually decrease to 117 by 2010 as a result of a decreasing number of agricultural jobs.

Colstrip

Colstrip's population is anticipated to peak at 7,844 persons in 1982, corresponding to construction employment at Units 3 and 4, mine expansion, and townsite expansion. After 1982 the population will decline to 3,866 by 1986--less than half the 1982, and equal the 1980, figure. Population will then remain relatively stable, gaining 3 percent from 1986 to 2010.

Forsyth

Population growth in the Forsyth area will follow a pattern similar to Colstrip. It will grow from 3,054 persons in 1980 to a peak population of 3,548 in 1983, a 16 percent increase. Population will then fall rapidly from 1983 to 1986, decreasing 19 percent to 2,890. Population beyond 1986 will fluctuate slightly but remain within the 2,800-2,900 range throughout the forecast period--to the year 2010.

Northern Cheyenne Reservation

The 1980 reservation population was 2,651 persons or 5 people per square mile. Natural increase will expand the population 1.1 percent annually, resulting in a 2010 population of 3,702 persons, 40 percent larger than in 1980.

Powder River County

Powder River County's 1980 population was 2,520 persons, a density of about 0.8 people per square mile. The population is projected to drop for the next three decades, beginning in 1982. The gradual reduction will average less than one percent per year through the 1980s, and 1.4 percent in the 1990s, but will result in a 2010 population 28 percent lower than in 1980.

The majority of the population loss will result from employment-related migration. A natural increase of 209 will partially offset the loss of 906 persons leaving for employment reasons.

Ashland Vicinity of Powder River County

The 1980 population in this area (fig. III-8) was 253 persons. A small amount of growth will occur in the area, increasing the population 14 percent by 2010. This area is the only part of Powder River County that would not decline in population by 2010, owing primarily to the Coal Creek Mine and the lumber industry.

Broadus

Broadus, the trade center for Powder River County, had a 1980 population of 712 persons. The population will increase slightly during the 1980s, owing to growth caused by oil exploration in the county. However, the town's population will begin to decline in the 1990s as oil exploration and production begin to decline. The population will fall from 736 persons in 1988 to 611 persons by 2010.

Custer County

Custer County's population will increase from 13,109 persons in 1980 to 13,626 in 1988. In 1980 Custer County had a density of 3.5 people per square mile; without Miles City the density was about 1 person per square mile. The major cause of growth will be natural increase. Employment-related migration out of the county will become substantial in 1989 and continue until 2004, because jobs are forecast to not increase fast enough to accommodate the growing labor force. By 2005, the population will be 6 percent less than in 1980. After 2004 the population will grow slowly, reaching 12,453 in 2010.

Miles City

Miles City and the surrounding area had a 1980 population of 11,582 persons. The population will grow an average 0.5 percent yearly until 1988, reaching 12,039. After 1988 population will decrease until 2005, when, at 11,010 persons, the figure will be 5 percent less than in 1980.

Occupational Diversity

Ranching is the principal occupation in the Ashland-Birney area. Over 50 percent of the households interviewed in a random sample earn their livelihood from agriculture: 40 percent of the households primary money earners are ranch proprietors; 15 percent, professionals; 14 percent, ranch workers; and 11 percent, clerical workers. The remaining 20 percent are other laborers, managers, operators, sales people, and craftsmen.

The Ashland community has a more diverse occupational structure than is typical for a town of its size and isolation (Doug Hooper, Mountain West Research, Inc., [MWRI], personal commun., 1982).

The Northern Cheyenne are employed primarily by the Tribal government in professional and clerical occupations.

Attitudes of Ashland and Birney Residents

People in the Ashland-Birney area see both advantages and disadvantages to coal mining. Seventy-five percent of the adults interviewed in the DSL survey felt that there would be some advantage to the residents of the area; 54 percent felt that there would be advantages to them personally. On the other hand, 95 percent felt mining would result in disadvantages to area residents; 61 percent felt there would be disadvantages to them personally.

Thirty-eight percent of the Ashland and Birney residents that were interviewed favor a coal mine between Ashland and Birney and 40 percent oppose the mine. Only 9 percent favor development of 4 or 5 mines within a 20-mile radius of Ashland; 62 percent oppose the idea.

According to those surveyed, the main advantage of a mine to area residents would be employment, mentioned by 36 percent. Fifteen percent felt employment would be an advantage to them personally. Twenty-two percent felt the main advantage would be economic, aside from employment, and 18 percent expected to benefit personally from these economic advantages. Other advantages mentioned, but each by fewer than 10 percent, were better community services, better shopping, and more job security.

Population influx was mentioned most frequently, by 60 percent of those interviewed, as a disadvantage to local residents. Other disadvantages mentioned, but by less than 10 percent of those interviewed, were the change in land use away from agricultural production, increased pollution, more crime, loss of privacy, change in lifestyle, greater workloads, more traffic, higher taxes, and reduced recreational enjoyment.

Social Organization

Extralocal Links

The communities of Ashland and Birney are tied to the larger society economically, politically, and socially. Both communities are linked to the national economy by the agriculture industry. Money enters the area for the purchase of agricultural products and is spent, primarily in regional business centers, for the purchase of ranch equipment and consumer products. The national beef market and, to a lesser extent, the forestry products market influence local economic decisions.

The Ashland community has established a tie with the Montana Department of Commerce through the Coal Board: the Ashland water and sewer district and elementary school district 32J have received grants from the Coal Board, and the community has received other Coal Board grants through Rosebud County. The link with the Coal Board is an important asset to the community because it provides access to resources needed to plan for and accommodate growth.

Ashland is linked to the county by one commissioner who lives in Ashland and two area landowners that are members of the county planning board. Although the commissioner was elected at large and represents the interests of the entire county, he does provide a link for local concerns to be presented at the county level. This link is important because it will probably increase the attention given to the Ashland area.

Birney is more removed from government, although one area rancher is on the county planning board. This isolation is breaking down, however, partially as a result of the Bureau of Land Management's coal leasing studies and the State's mining permit process. Recently, State and Federal agencies have increased their presence in the Ashland and Birney communities through public meetings and research on coal development.

Although the communities are heavily influenced by Federal government, owing to the Bureau of Land Management and Forest Service land ownership in the area, they have little direct influence or involvement in government decisionmaking (Doug Hooper, MWRI, personal commun., 1982).

The Birney community is tied closely to Sheridan, Wyoming, both economically because Sheridan is the nearest regional trade center and socially because children from Birney attend school there. Many children board in Sheridan throughout the school year, establishing friendships with Sheridan families.

Both communities are also linked to the larger society by the media.

Stratification

Income among households in the Ashland-Birney area varies substantially. According to the DSL survey, 6 percent had a 1980 household income of less than $8,000 before taxes, 24 percent $8,000-15,999, 21 percent $16,000-23,999, 15 percent $24,000-31,999, 9 percent $32,000- 39,999, and 16 percent had incomes over $40,000. Access to business positions is limited because the present size of the population does not warrant growth in the business sector. In addition, the sawmill, Tongue River Electrical Cooperative, the telephone company, and liquor store are not locally owned. The remaining businesses are owned by white residents (Doug Hooper, MWRI, personal commun., 1982). Most ranches have been in the family for many years and they are seldom sold to persons outside the family.

In Birney the primary determinant of access to economic resources is probably land ownership.

Seventy-five percent of those surveyed felt people's individual situations are taken into account when decisions are made that concern their community. Seventy percent disagreed with the statement that the community is run by members of a few powerful groups. Sixty percent felt residents of their community can influence decisions that affect them.

In the Ashland-Birney area business owners and landholders with a long history in the area have the most social prestige. Ranchers are considered the leaders of the Ashland-Birney communities by 45 percent of those surveyed. DSL informant interviews suggest area residents value longevity and independence more than careers. Professionals employed at the St. Labre Mission, although well educated, are not considered part of the Ashland community by many and lack much prestige. They are generally from outside the area (Doug Hooper, MWRI, personal commun., 1982). Forest Service workers, other than seasonal workers, typically stay for two years and do not appear to become integrated into the community either. They, too, generally are not held in much esteem. Many sawmill workers are transient and therefore they, as well, enjoy little esteem. The Indian population has the least amount of social prestige and esteem of all groups; informant interviews suggest they are not considered a part of the community by some residents.

In the Birney community, although length of family residence and size of land holdings constitute the measure of social prestige and esteem, there seems to be less consciousness of economic position than in Ashland.

Differentiation

Ashland and Birney differ in a number of ways. Although ranching is the main occupation in the Ashland-Birney area, residents of Birney are almost exclusively ranchers, whereas in Ashland the occupational structure is diverse. Businesses in Ashland include the St. Labre Mission and School, a sawmill, two cafes, two bars, two gasoline stations, two grocery stores, a laundromat, a craftshop, a beauty shop, a hardware store, a bank, and a state liquor store. Agricultural operations in the Ashland and Birney areas are owned by locals who typically have a long history in the area. Sixty percent of the sawmill workers are generally Northern Cheyenne; the remainder are from outside the area. Most of the people in the professional occupations are also not native to the area. The proprietors, clerks, service workers, and agricultural workers are mostly long-time residents (Doug Hooper, MWRI, personal commun., 1982).

The residents of Ashland have a broad range of values and interests for an isolated community of 500 people. The town is fragmented and has little community cohesion; it is characterized by many small social groups whose members seldom interact with one another, except to accomplish routine daily activities. Consensus is difficult to obtain because of the structure of the community and the value attached to independence. There are few community activities (Doug Hooper, MWRI, personal commun., 1982). The public elementary school provides nearly the only focus for community action.

People in Birney strongly identify with their community. Leadership is informal and everyone participates when something is needed, according to informants. The only groups in the community, according to residents interviewed, are those opposing or favoring coal development in the area. The Northern Cheyenne community of Birney Day Village, 6 miles west of the town of Birney, is considered a separate community.

Little cultural exchange goes on between Indians and non-Indians. Daily interaction between the two groups takes place mostly during commercial activity. The groups have separate cultures and different values. Whites in Ashland generally commented that relations between the Northern Cheyenne and non-Indians are good. Observations and some informant interviews indicate that racial antagonism exists. Although there is little open conflict, there is mutual resentment. The Indian population has not, however, challenged the way the community operates or their position in the community (Doug Hooper, MWRI, personal commun., 1982).

In the DSL survey, when asked what was necessary for a satisfying life, respondents from the Ashland-Birney area most frequently mentioned friends and family. The next most frequently mentioned need was financial security. What people like most about the area is privacy, followed by the countryside, way of life, and the people in the area. Seventy-five percent stated they would either never consider leaving the area or would be reluctant to leave. Respondents dislike the isolation most, particularly from medical facilities.

The Northern Cheyenne's value system is different from that of non-Indians. When asked what is the most important part of the Northern Cheyenne way of life, culture, and spirituality was mentioned most frequently. Sixty-two percent regularly attend pow wows. One half of the Northern Cheyenne surveyed speak the Cheyenne language regularly; in nearly one third of the households surveyed, Cheyenne is the primary language spoken and in 16 percent of the surveyed households some members of the households do not speak English. When asked what makes life most satisfying, kinship was mentioned most frequently. The next most frequently mentioned item was physical environment. When asked what they liked most about the community in which they live, most respondents said the physical environment. What respondents liked the least were social problems (particularly alcoholism) and pollution.

There are few formal leadership positions in Ashland or Birney because the communities are unincorporated. Ashland has a water and sewer board and a fire board that were established by the county commissioners. Although the authority of the two boards is limited to the collection and disbursement of funds for the water and sewer system and fire protection, they also have considerable implicit power because they are viewed as having duties and responsibilities beyond their legal responsibilities (Doug Hooper, MWRI, personal commun., 1982). Membership on the two boards is identical, with the exception of one additional member on the water and sewer board.

The leadership structure in the town of Ashland is stable; most of the influential people are long-time residents. One of Rosebud County's commissioners lives in Ashland. He has long been an informal leader in the community. The people in leadership positions are mostly business proprietors and a few ranchers. Most of the area ranchers, however, have little influence in Ashland (Doug Hooper, MWRI, personal commun., 1982). In general they do not seem particularly interested in the community, aside from the public school, according to informant interviews. Three of the five school board members are ranchers.

The Birney community, in contrast, is more community minded. There is resistance to government and pride in being self sufficient. The only formal leadership positions are the trustees of the elementary school board. None of the board positions are held by area ranchers.

Most political activity in the Ashland community occurs informally; leaders are approached and a solution is generally developed and agreed upon before formal action is taken (Doug Hooper, MWRI, personal commun., 1982).

Integration

There is relatively little social integration in Ashland. Most tasks are accomplished by individuals or small closed groups (Doug Hooper, MWRI, personal commun., 1982). In the Ashland-Birney area there is occasionally cooperation among neighbors to accomplish ranch tasks, such as branding calves, but generally work is completed by individual ranches. Relationships in the Birney community are interconnected through kinship.

No community action is being taken to prepare for mine-related development in Ashland, nor is there any outside organization that is making plans for the community. Some individuals are providing housing lots, but no coordination is taking place to provide for other demands expected from growth and no formal group exists to coordinate plans with Montco or State agencies.

Local residents point to the water and sewer board as an indication that Ashland can plan for development; however, the community did not take action on the water and sewer system until the Montana Department of Health and Environmental Sciences gave notice that it must. Moreover, informants frequently mentioned that it is difficult for the members of the Ashland community to take action.

Birney also has no formal group to plan for possible development, but such planning is less necessary in the Birney community.

Family Structure and Well-Being

Most people in the Ashland area raise a family. Of the households surveyed, 45 percent had children under the age of 19. The family unit is strong among ranch families and also among some people living in town, according to informants. Some families recreate together often; activities mentioned in DSL interviews included hunting, fishing, boating, trapping, 4-H activities, and sports events at school. Eighty-four percent of the households surveyed with children stated that their children spend most of their time with the immediate family when not in school. Thirteen percent spend most of their time with relatives. Adults in 45 percent of the households surveyed spend most of their time, when not working, with family members within the household. Twenty-one percent spend most of this time with relatives. Twenty-six percent spend such time primarily with neighbors. Despite the emphasis on the family, however, others interviewed stated that activities in Ashland are not geared toward families.

According to informants interviewed, the Birney community is also oriented toward the family, and family ties are strong. Young members of families are often incorporated into the family ranch business. All age groups socialize together and school activities are major social events.

Ninety-three percent of the adults surveyed in the Ashland-Birney area stated they are satisfied with their community as a place to raise a family; 58 percent are very satisfied. Seventy percent are satisfied with family-oriented activities in the community. Thirty-nine percent of those households with children had no concerns about raising their children in the Ashland or Birney communities. In the remainder of the households with children, concerns included the long distance to schools, too few other children, the lack of recreation, the poor quality of education available, drinking, and drug abuse. Concerns mentioned by only one person are not listed here.

Kinship was most frequently listed as what makes life most satisfying to the Northern Cheyenne interviewed by the Northern Cheyenne Planning Office. Family life was also the most important factor contributing to a satisfying life for residents interviewed in the Birney and Ashland districts of the Northern Cheyenne Indian Reservation.

Northern Cheyenne

The Northern Cheyenne are a culturally distinct population residing immediately west of the Tongue River from the Montco Mine site. The Northern Cheyenne in the Ashland and Birney districts would be the most likely to be affected by the Montco Mine. (The reservation is divided into five districts. The Ashland and Birney districts are closest to the mine.) The following description of the Ashland and Birney districts is taken from the Northern Cheyenne Planning Office's [NCPO] report and survey (August 1981).

The Northern Cheyenne revere the land. The strength of their culture and spirituality is based on the natural environment. The Northern Cheyenne supplement their income through hunting, gathering, fishing, and firewood collection. They use the reservation's natural environment for recreation.

The Cheyenne way of life today is mainly maintained through kinship. Although the Northern Cheyenne people understand some of their customs and traditional beliefs, they do not seem to know how to adapt them to present day life. Individualism is gradually replacing the importance placed on group welfare. This change has weakened tribal cohesion. Some tribal members believe that young people are becoming more confused, resulting in severe social and psychological problems. Their confusion results from not speaking or understanding the Cheyenne language, which uniquely expresses Cheyenne beliefs and values.

The Northern Cheyenne feel their culture is disintegrating. Concern was expressed in the NCPO survey that further cultural disintegration may occur as a result of the Montco Mine development.

Over 70 percent of the people surveyed in these districts participate regularly in pow wows, which express the Northern Cheyenne culture. About a third of those surveyed in the Ashland district and two thirds of those surveyed in the Birney district participate regularly in traditional spiritual activities, such as prayer meetings and sun dances. Culture and spirituality were most frequently stated as the most important aspect of the Northern Cheyenne way of life.

Two thirds of the Birney district households supplement their income by hunting, gathering, gardening, and fishing; one third of the Ashland district households also supplement their income in this way.

Households are large, typically with 3 to 6 members. Often more than one family, or relatives outside the immediate family, live in each household. This is especially true in Birney. Family cohesion is evident at public gatherings and traditional spiritual events.

Most members of the Birney district view their community as closely knit; the members visit one another frequently. In contrast, fewer than one third of the Ashland district households view their community as closely knit.

The majority of Birney district household members surveyed oppose development of the Montco Mine. Those responding to the question in the Ashland district were split over approval; over half did not respond.

COMMUNITY SERVICES

Summary: This section presents forecasts of what would happen to housing, facilities, and services in Rosebud, Powder River and Custer Counties if no new mines are developed. Those facilities and services that will not be significantly affected, because either demand increases will be minimal or an existing surplus in capacity already exists, will not be discussed. This entire section is based on the 1981 report by Mountain West Research, Inc. The model used by Mountain West Research to arrive at the data contained here is discussed briefly in appendix 6.

Rosebud County

Housing

Demand for housing units in Rosebud County is forecast to increase from 4,287 in 1980 to 5,803 in 1982, a 35 percent increase over a two-year period. The increase is largely due to an expected population influx for construction of Colstrip Generating Units 3 and 4. The population will peak in 1984, then decline rapidly until 1986, causing housing demand to drop to 4,469 units. After 1986, demand will increase steadily to 5,076 units in 2010, an 18 percent increase over 1980.

General Government

Current staffing of the general government offices located in Forsyth is projected to meet long-term demand. A temporary demand for staff increases from 19 to 24 persons will occur between 1982 and 1984. No long-term demand for additional office space is projected, though periodic work loads will create crowded conditions.

Law Enforcement

An additional 12 officers will be needed by the Rosebud County Police Department between 1983 and 1986 and another four from 1993 to 2010. Existing space and patrol vehicles are projected to be adequate, in spite of a continuing desire for an office/detention facility in the Ashland-Birney area.

Hospitals and Health Services

Long-term demand will require an additional five physicians (a 100 percent increase), one dentist (a 20 percent increase), 14 emergency medical technicians (a 108 percent increase), and 21 hospital beds (a 81 percent increase) above the existing supply. Though current ambulance services for the county as a whole will be adequate for long-term demand, the Ashland-Birney area will continue to be underserved. This is a serious shortfall: the area is far from the closest hospital in Forsyth and is now as medically underserved.

Shortages of medical manpower and services in the county will occur between 1983 and 1986 if temporary arrangements are not made. Both temporary and long-term shortages will be worsened should Federal funds be cut that help support medical services for much of southern Rosebud County.

Public Health

Increased demand for public health nurses will require a rise during temporary peak demand of one nurse to five and for the long term to three nurses. Additional space will also be needed: 1,200 square feet for temporary peak demand, 600 square feet for the long term. The current area totals 300 square feet.

Staffing and office space for the sanitarian will be adequate for the long term, but a temporary increase of one person and 300 square feet of space may be necessary between 1983 and 1986.

Public Works Shop

An additional seven persons will be required by the county shop due to long-term permanent demand. Temporary demand from Colstrip construction will necessitate the addition of five above that level. The existing 20,000-square-foot shop will require an additional 4,500 square feet to meet long-term demand and 8,000 square feet to meet peak temporary demand.

Solid Waste Disposal

The present 25-acre solid waste disposal site now in use will be adequate for about 20 more years. After 2001, three acres will have to be added annually.

Library

The existing county library staff, number of volumes, and building space will be adequate to meet long-term demand. The Sagebrush Federation of Libraries' bookmobile, which serves Colstrip and Ashland, will supplement services provided at Forsyth. A small, temporary increase in staff, space, and volumes will be necessary between the construction years of 1983 and 1986.

Social Services

The social welfare programs provided by the Rosebud County Department of Public Welfare are identical to those available in all county offices in Montana. In the quarter ending in March, 1982, 121 cases were served and 60 cases were closed. Of the 389 total services provided, the highest service incidence was in protective service (for abused children or adults) investigation (118 cases) with 49 cases involving ongoing protection. According to the Montana Department of Social and Rehabilitation Services Evaluation Bureau (case load reports and personal communication with Donna Wirth, Management Analyst, July, 1982) Rosebud County workers have case loads which exceed state standards. A grant from the Montana Coal Board to the Rosebud County Department of Public Welfare for fiscal year 1983 should allow an increase in both professional and support personnel.

Ashland-Birney Area

Housing

Demand for housing units in Ashland will rise from 179 in 1980 to 209 in 1984. Demand will drop slightly the next year and fluctuate between 194 and 206 until 2010. The 206 units, needed during 2005, represent a 15 percent increase over 1980.

Housing demand in the Birney area will rise from 50 units in 1980 to 55 by 1985. Demand is then expected to drop to 46 in 1998 and increase to 50 by 2010.

Safety

Because Ashland and Birney are unincorporated communities, general government and public safety services are provided by Rosebud County. Nonetheless, the area does have a public safety problem, because of the lack of organized fire protection services in the Birney community.

Public Works

The present water supply system in Ashland is adequate to meet both temporary and long-term demand, but storage capacity is not. A 19 percent increase, from 200,000 to 237,000 gallons, will be required for long-term permanent demand. Another 36,000 gallons will be needed to meet temporary demand in 1986. Birney residents use individual wells for their water supply.

Education

The Ashland elementary school currently has 11 teachers; the demand for teachers will decline and fluctuate between seven and eight teachers until 2001, when demand will drop to six and remain there through 2010. The elementary school at Birney has one teacher, which will be adequate through 2010.

At present there is no high school in either Ashland or Birney. It is assumed for the purposes of this study that a facility will be built in Ashland. A 24-acre site will be needed. Three high school teachers will also be needed through 2010. Space requirements will fluctuate between 500 and 700 square feet through 2010.

Colstrip

Housing

The demand for housing units in Colstrip will increase from 1,050 in 1980 to 2,356 in 1983. After construction of Units 3 and 4, demand is expected to decrease to 1,115 in 1986, then increase gradually to 1,291 in 2010, a 23 percent increase over 1980. The demand for multi-family housing is expected to rise from 28 percent of total demand in 1980 to 36 percent in 2010.

Fire Protection

Additional fire protection will be needed temporarily. The volunteer force will need 32 more volunteers, 1,000 more square feet of space, and one more vehicle.

Public Works

Additional storage capacity for 405,000 gallons of water will be required between 1983 and 1985 if current construction plans for system expansion are not completed.

Education

Between 1982 and 1986, 11,000 square feet of additional classroom space will be temporarily needed. As construction workers and their families leave and the remaining school-age children progress through the upper grades, long-term space requirements are projected to drop to half of the current capacity. Temporary classrooms may be warranted.

Forsyth

Housing

Housing demand in the Forsyth area will increase to 1,392 units in 1983, then fluctuate in the 1,200 to 1,300 range through 2010. The demand for 1,290 units in 2010 is a 4 percent increase over the 1980 level. Demand for multifamily housing is forecast to increase from 15 percent of total demand in 1980 to 23 percent in 2010.

General Government

City government staff now requires two additional staff to meet minimum standards; this would increase the total from seven to nine.

Public Safety

The city's fire protection service will require an increase from 16 to 30 persons to meet long-term demand. Fire protection in Forsyth is operated by volunteers. Space and vehicles for the department will remain adequate at the existing level through the next three decades.

Public Works

The current water supply and water treatment system for Forsyth will meet the population's needs for the next three decades. Water storage capacity, however, will need to be temporarily increased 480,000 gallons between 1982 and 1986.

Education

The current number of elementary teachers is adequate for long-term needs, but temporary peak demand between 1982 and 1984 will require an increase from 18 teachers to 27. Staffing requirements will then decline through 2010.

Powder River County

Housing

Housing demand is expected to decline gradually from the 1980 level of 1,080 units to 990 units in 2001, then rise slightly to 1,005 units by 2010. The 2010 demand will be 9 percent below 1980.

Public Safety

One additional sworn officer will be needed in the Powder River County Police Department between 1983 and 1986. This would increase the force to five. The need for the additional officer would end after 1986, as the population decreases with the slowdown of oil production.

Health and Welfare

One additional physician and seven hospital beds are needed to meet the demand for the next three decades. The county is currently served by one general practitioner and does not have a hospital; emergency transfer service to hospitals in either Forsyth, Miles City, or Sheridan need improvement.

Social Services

Social services are provided in Powder River by a worker who spends only part time in the county (between 25 percent and 50 percent). The worker had only two cases, both protective services, in the quarter ending March, 1981. It is not clear whether the low rate of service utilization is because of little need or because of utilization difficulty. Statistics do not indicate that current demand is too great for the resource, but since only a part-time person serves the county, it is unlikely that case loads can increase much without overloading the provision system.

Ashland Vicinity of Powder River County

Housing demand will increase 34 percent, from 97 units in 1980 to 130 units in 2010.

Broadus

Housing demand in Broadus is expected to fluctuate between 335 and 355 units during the next 3 decades.

The existing water supply for Broadus is well above the projected need. Water storage is also adequate.

The existing solid waste disposal site will be adequate for approximately 10 more years, but long-term needs will require an additional acre per year after 1991.

Custer County

Housing in Custer County is forecast to decline slowly from 5,477 units in 1980 to 5,249 by 1999. Demand is then expected to increase by about 50 units a year to 5,743 by 2010. This would be a 5 percent increase over 1980. Demand is expected to rise for multi-family housing while declining for single-family units and mobile homes. This shift follows a national trend from single- to multi-family units.

In Custer County, 240 social services were provided to 146 active cases in the quarter ending in March, 1982. The highest service incidence was in case management protective service investigation and ongoing protection. Case loads are currently higher than desirable and additional cases would further overload the service provision system.

Miles City

Housing demand in Miles City is forecast to decline slowly from 1980 to 1999, then increase somewhat by 2010. This change would result in a net 5 percent increase from 1980 to 2010.

Northern Cheyenne Reservation

Information about community services is taken from the Northern Cheyenne Planning Office [NCPO] report (August, 1981) unless otherwise noted.

Housing

No exact count of houses or occupancy rate could be provided by NCPO because of insufficient data.

Tribal Government

The Northern Cheyenne tribal government bases its authority on a constitution and a Federal corporate charter. The government's status is one of "quasi-sovereignty" due to the trust responsibility of the United States government.

The government consists of a president, elected by a majority of popular vote, one council member per 200 people elected from the five districts, and a vice-president elected by fellow members of the tribal council.

Law Enforcement

Law enforcement on the reservation is provided by the Northern Cheyenne Police Department. Police officer conduct is the responsibility of the Northern Cheyenne policy commission, but ultimate accountability of the department is to the executive branch of the tribal government, i.e., the tribal president. The department consists of seven policemen, one chief of police, one jailer, five dispatchers, and one police clerk.

Health Services

The Indian Health Service operates an out-patient clinic in Lame Deer. Patients requiring hospitalization can go to an IHS hospital at Crow Agency that serves both the Crow and Northern Cheyenne reservations.

Medical personnel at the Lame Deer clinic include four full-time doctors, five full-time nurses, two part-time nurses, two full-time field nurses, two pharmacists, two dentists, four dental aides, one part-time optometrist, one x-ray technician, one lab technician, one health educator, and three medical health record technicians. Additional doctors are contracted with to serve the clinic in case of need. Non-Indian patients are not served by the clinic, except in cases of emergency.

The ambulance service, located in Lame Deer, has a project director, a secretary, eleven driver/attendants, and a varying number of dispatchers. The service has two 1979 Type-II van ambulances and one 1978 converted van ambulance.

Water Supply

Birney Village has one well and a pumping capacity of 50 gallons per minute (gpm). Birney has a 15,000-gallon storage tank and supplies are supplemented by a spring between Birney and Lame Deer. The well is sufficient to supply 20 more homes.

Busby has three wells and pumps. Two pumps are being used to pump up to 100 gpm. Current pumping capacity is insufficient, but use of the third pump would make capacity sufficient. There are two storage tanks with a 63,000-gallon capacity, only a one-day supply.

Muddy Cluster has one well and a pumping capacity of 50 gpm. Capacity is sufficient for 10 to 15 more homes but a standby emergency pump is needed.

There are four wells at Lame Deer with a total pumping capacity of 250 gpm, enough for 40 to 50 more homes. The two storage tanks have a 200,000-gallon capacity, enough for one day and not enough for more homes.

Ashland has one well with a 50 gpm capacity, enough for 25 to 30 more homes. An emergency standby pump is needed. Two storage tanks with a 63,000-gallon capacity are more than sufficient for the community.

Community Waste Disposal Systems

The 3-cell, 10-acre lagoon system serving Lame Deer has nearly reached capacity. There are an estimated 374 homes connected to the system. Ashland (Northern Cheyenne Reservation) has a 2-cell, 4-acre lagoon system. The system has excess capacity since two cells have never reached full capacity. An estimated 20 homes use the system. Birney village (Northern Cheyenne Reservation) has a 2-cell, 2-acre lagoon that has never reached capacity. Nine homes are connected to the system; more homes would require system modification. Muddy Cluster has a 2-cell, 2-acre lagoon system serving 14 homes. About 50 more homes could be added to the system. Busby uses a 2-cell, 4-acre lagoon system that serves 82 homes. A planned expansion to 11 acres will enable the system to add 75 to 100 more homes. The line needs a major overhaul.

There are at least 375 scattered homes on the reservation that are not connected to the community systems. Of these, 223 have known septic tanks/drainfields. The Indian Health Service plans to provide a septic tank pump truck in the near future.

Fire Protection

Fire protection for forests and prairie is provided by the Bureau of Indian Affairs (BIA)--Forestry. BIA-Forestry provides adequate protection for the forests and prairie on the reservation.

The entire reservation is provided building and auto fire protection by one part-time fireman and five volunteer firemen who are currently being trained by the paid fireman. One 500-gallon tank and hose truck serves the reservation. Building and auto fire protection is now inadequate.

Education

Lame Deer had its first school built by the United States government in September 1890; the school has since been expanded and become a public school of Montana. The school expects to have sufficient capacity for the present enrollment but has no room for expanded enrollment. The current enrollment is 381 students with 27 teachers and 1 school nurse. Of the 381 children, 361 are enrolled Northern Cheyenne; 20 children are enrolled in other tribes or are non-Indian.

Headstart program has 7 centers on the reservation. The staff consists of 1 head teacher, 2 aides, and 1 nutritionist/cook per center. Enrollment is 136, of which 126 are enrolled Northern Cheyenne, and 10 are from other tribes or are non-Indian.

Busby School is a tribal school. Previously, it was a BIA-funded school. Enrollment for K-12 totals 218, 196 are enrolled Northern Cheyenne and 22 are from other tribes or are non-Indians. Staffing totals 36, 32 certified teachers and 4 are aides.

FISCAL CONDITIONS

Summary: Property taxes are the most important source of local government and school district revenues in Rosebud, Powder River, and Custer Counties (Mountain West Research Inc. [MWRI], Nov. 1981). State and Federal impact assistance have added significant amounts to this in recent years.

Rosebud, Powder River, and Custer Counties

Over the last four years, property taxes have provided an average of 40 percent of Rosebud County's revenues, 71 percent of Powder River County's revenues, and 33 percent of Custer County's revenues (MWRI, Nov. 1981). In school districts that contain coal or oil development taxable value, most general fund revenues have come from property taxes paid in that district alone. In other school districts, such as Ashland Elementary, Broadus Elementary, and both high school and elementary in Forsyth, most general fund revenues have come from the County Equalization Levy (MWRI, Nov. 1981).

In 1980 energy development made up more than 60 percent of the taxable value in Rosebud County and almost 80 percent in Powder River County (Montana Department of Revenue, 1980). The Colstrip Power plant and mining machinery were the next largest components in Rosebud county. (Montana Department of Revenue, 1980). In contrast, residential and commercial property in Miles City and agricultural property made up most of the tax base in Custer County (Montana Department of Revenue, 1980).

As oil production in Powder River County declines over the remainder of the century, the county will lose the bulk of its taxable value (MWRI, Nov. 1981). At the current mill levy, the eroding tax base will produce insufficient revenues to fund the current level of county services beginning in 1992 (MWRI, Nov. 1981). In contrast, increased coal production at the Western Energy mine and completion of Colstrip Units 3 and 4 will increase Rosebud County's taxable value by about 22 percent over the next four years (MWRI, Nov. 1981, Appendix D-3).

The large amounts of taxable value provided by energy development have kept tax rates low in Rosebud and Powder River Counties. For comparison, Big Horn County, Montana's other major coal mining area, had a total mill levy for state, county, and school purposes in 1980-81 of 93.69 mills. That made it the only county with a mill levy lower than Rosebud's 100.82 mills and Powder River's 101.42 mills (Montana Department of Revenue, 1980, p. 111). Statewide, the average was 198.16 mills.

One exception to these extremely low rates is the Ashland elementary school district, 32J, which is the district nearest the proposed minesite. The 1980-81 tax rate was here was 126.94 mills in the Rosebud County portion and 141.29 mills in the Powder River County portion (Montana Tax Foundation, 1981, pp. 50 and 58).

LAND USE

Summary: The pattern of land uses of the entire mine plan area is similar to that of the region.

Permit Area

The North King mining unit and the facilities area, like the region, are dominated by livestock grazing. (See table II-24.) The proposed permit area does, however, contain a higher percentage of irrigated hayland, dryland crop area, and farmstead acreage than the remainder of the mine plan area. About 17 acres of the irrigated hayland are classified as prime farmland by the Soil and Conservation Service. (See Soils.)

At present, the condition of the grazing land in the permit area is "low good," with existing vegetation at about 51 percent of climax. The recommended stocking rate (RSR) for the permit area (not including agricultural or disturbed areas) is 231 cow-calf units for a one-month grazing period, or 26 cow-calf units for a nine-month period. The potential RSR is 241 cow-calf units for a one-month grazing period, or 27 cow-calf units for a nine-month period (assuming high good range condition, with vegetation at about 75 percent of climax). The area's irrigated haylands usually produce

TABLE II-24

Existing Land Use in Montco Mine Plan Area

Land Use Type	Disturbance North King Mining Unit	Disturbance Facilities Area	Disturbance Associated	Total Mine Plan Area
Irrigated Hay	0	22	0	150
Dryland Crop	0	4	7	14
Rangeland	405	119	596	8,962
Pine/Juniper	95	19	0	1,002
Farmsteads	0	<1	0	26
Impoundments	2	0	0	8
County Road	0	5	0	9
TOTAL	502	169	603	10,171

Source: Montco, October 1983, p. III-1-2, Map III-1, J-2, written commun., January 9, 1984, and Montco, 1983, Vol. 3, chapter IV.

three to four tons per acre per year and the hay is fed to the current owner/operator's cattle throughout the winter (D'Appolonia Consulting Engineers, Inc., September 1980, p. J-12).

Mine Plan Area

Mine plan area (see fig. I-2) land use is typical of Rosebud County (D'Appolonia Consulting Engineers, Inc., September 1980, p. J-10). Three ranching operations lie within the mine plan area, each similar to other cow/calf operations in southern Rosebud County, particularly to those along perennial streams and those with Forest Service grazing allotments. Cattle are fed during the winter with hay grown in irrigated fields along the Tongue River and graze on native range during the rest of the year. Ranches in the area use Forest Service grazing allotments during all or part of the May-through-November period.

The area also provides wildlife habitat (D'Appolonia Consulting Engineers, Inc., September 1980, p. J-10). The habitat supports mule deer, white-tailed deer, pronghorn antelope, and a variety of other species. (See Wildlife.)

TRANSPORTATION

Summary: Due to sparse population and widely separated towns in Rosebud, Powder River, and Custer Counties, most people, consumer goods, and agricultural products move by roadways. The road network is not well developed but is generally adequate for the existing population. (See fig.

II-9.) Rail service is provided by the Burlington Northern Railroad (BN). Commercial passenger service is provided by bus on the interstate highways and by air carriers at Billings and Miles City.

Highways

Interstate 94, the region's main east-west artery follows the Yellowstone Valley. U.S. Highway 212 (Federal Aid Primary [FAP] 37) is the major highway serving the southeastern corner of Montana and is the nearest east-west connection to the proposed minesite. Federal Aid Secondary (FAS) Route 566, the main road to the proposed mine area, leaves Ashland and travels southwest about 7 miles to the Montco Mine area, then continues through Birney and intersects the Decker road (FAS 314) north of Decker.

A loose network of county and Bureau of Indian Affairs roads provides ranchers and rural residents access to the primary and secondary road system. These are mostly gravel surfaced, with curves and grades conforming closely to the existing terrain.

Table II-25 presents the average daily traffic count (ADT) during 1980 for various road segments near the proposed minesite. Nowhere does traffic approach the theoretical capacity for standard two-lane or multi-lane roads (1,000 vehicles/lane/hour), but effective capacities on individual road segments are less, due to surface conditions, narrow shoulders, curves and grades, rail and road cross traffic, and the mixing of slow with faster-moving vehicles. Traffic volumes have increased substantially in recent years, particularly on FAP 39, due to coal development and the construction of Colstrip Generating Units 3 and 4.

Table II-26 presents the mean traffic accident rates for area roads from 1976-80. The accident rates are about the same as the average State rate for primary system highways. Between 1976 and 1980 there were 479 traffic accidents in which 32 persons were killed and 254 injured.

Railroads

There is no rail service in Powder River County. Rosebud County and Custer County are served by the Burlington Northern (BN). BN's cargo in eastern Montana consists primarily of coal and agricultural products. Principal inbound commodities are fertilizers, building materials, and machinery; principal outbound commodities are coal, grain, and other agricultural products (Mountain West Research, Inc. [MWRI], Nov., 1981, p. 3-27). During 1981, 16 trains per day, 10 coal and 6 general merchandise, passed through Miles City on the BN mainline (ICC, 1983, p. A3-14).

RECREATION

Summary: Recreation resources in the Ashland-Birney area include natural resources, such as the Tongue River and the National Forest, developed recreational facilities on

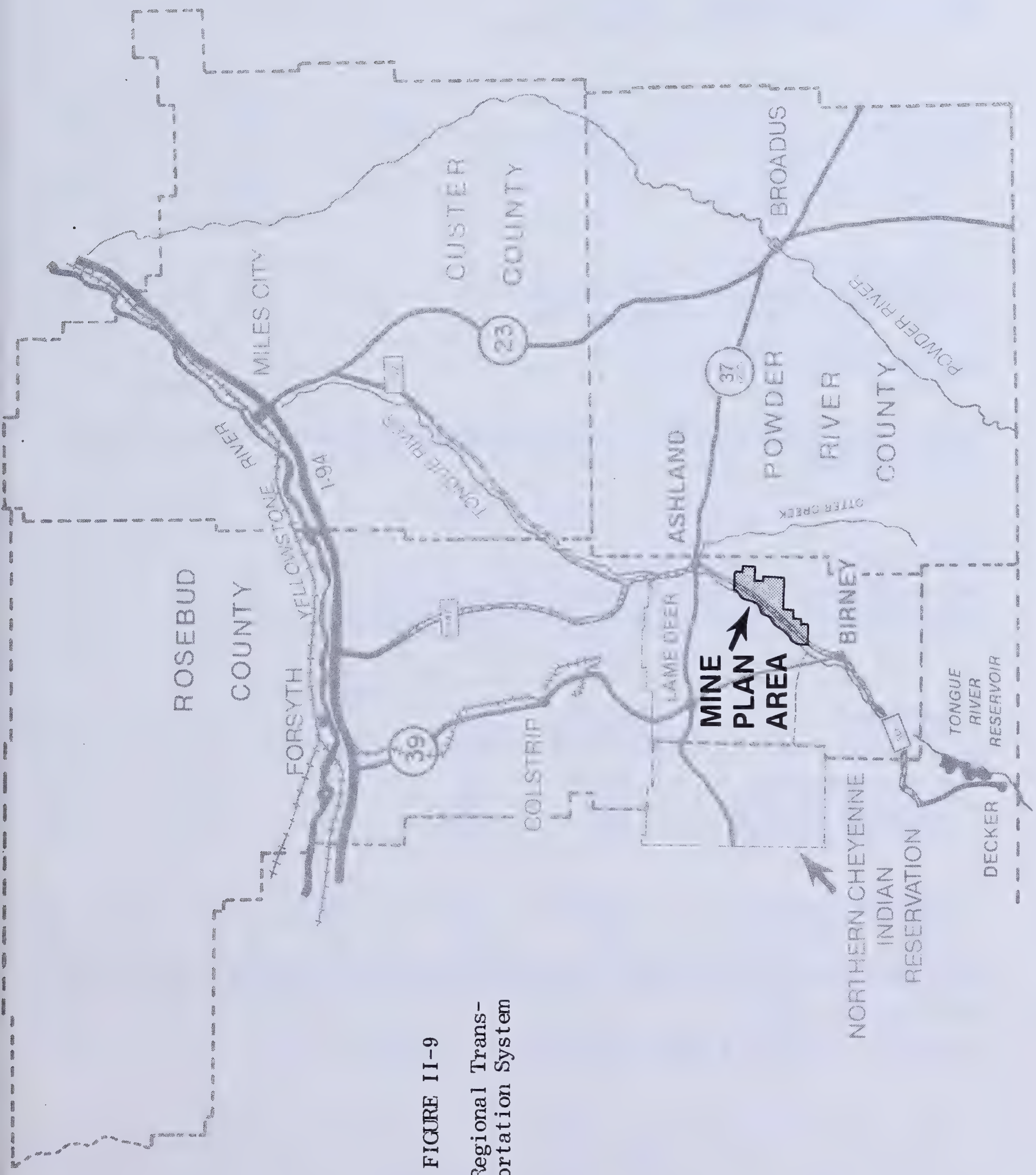

FIGURE II-9

Regional Transportation System

TABLE II-25

Current and Past Growth
of Traffic Volumes on Various Road Segments

Road Segment	1980	1971	% Growth 1971-80
FAP 39			
I-94 to Colstrip	1,200	253	374
Colstrip to Lame Deer	560	203	176
FAP 37			
Lame Deer to Ashland	940	730	29
Ashland to Otter Creek Road (FAS 484)	740	599	24
Otter Creek Road to Broadus	680	500	36
FAS 566			
Ashland to Montco Minesite	115	80 (1976)	NA

Source: ICC, 1983, p. A3-38; Montana Department of Highways, written communication, undated.

TABLE II-26

Traffic Volumes, Accidents, Injuries, Fatalities and
Accident Rates for Selected Segments of Area Highways, 1976-1980

Road Segment	Mean ADT[1] for 1976-80	Total Number			Accident Rate[2]
		Accidents	Injuries	Fatalities	
FAP 37					
Jct I-90 to Lame Deer	1,116	155	60	13	1.81
Lame Deer to Jct FAS 566	1,027	90	57	6	2.37
Jct FAS 566 to Broadus	612	81	48	2	1.76
FAP 39					
Colstrip to Lame Deer	456	52	35	6	2.75
Jct I-94 to Colstrip	879	101	54	5	2.21

Source: Montana Department of Highways, Highway Information System, unpublished computer printout.

[1] ADT=average daily traffic

[2] Accident rate = number of accidents per million vehicle miles.

the forest, recreation sites on the Northern Cheyenne Indian Reservation and developed facilities in Colstrip and Ashland. People in the area prefer outdoor activities.

The Ashland-Birney area's major resources for undeveloped recreation are the Tongue River and the Ashland Division of the Custer National Forest (fig. II-10). The Tongue River is used for fishing, boating and passive enjoyment (Northern Cheyenne Planning Office [NCPO], August 19, 1981, p.80). Nearly half of the surveyed Northern Cheyenne had taken a walk along the Tongue in the past year to fish, hunt, or simply enjoy the area. (NCPO Survey, 1981).

There are three State recreation areas in Rosebud County: East Rosebud, Far West, and West Rosebud. The sites are owned by the Montana Department of Fish, Wildlife and Parks. All three areas provide opportunities for fishing and float trips. East Rosebud is also used for picnicking and boat access. In addition, the Forsyth Rest Area, owned by the Montana Department of Highways, has picnic facilities.

Federally owned recreation facilities in the Ashland-Birney area include four sites on the Custer National Forest: Poker Jim Butte, Cow Creek, Holiday Spring, and Red Shale. All are used for picnicking. Cow Creek is also used for camping and fishing and Red Shale is used for camping and hunting (Montana Department of Fish, Wildlife, & Parks, October 1981, p. 18 and 21). Of the four sites, Red Shale receives the most use, about 20 man-days weekly. Cow Creek receives 5 to 10 man-days of use a week. Holiday Springs and Poker Jim Butte receive about 5 man-days use monthly. In addition, a play is performed each year by Montana State University at Poker Jim Butte; 100 to 150 people usually attend. (Chuck Sundt, Acting District Ranger, Ashland Division, Custer National Forest, oral commun., February 1981).

There are no trails in the national forest but much of it is accessible from roads (Fish, Wildlife, and Parks, 1978, p. 153). About 90 percent of the access is controlled by ranchers. The forest receives a large amount of forest use, primarily by locals for hunting. The area is also heavily used by Colstrip residents and to a lesser extent by out-of-state residents who contribute 20 percent of the overall forest use.

There are a number of developed recreation sites on the Northern Cheyenne Reservation. Crazy Head Springs is used for fishing, boating, swimming, camping, and picnicking. Lost Leg is used for camping, picnicking, and fishing. Green Leaf is used for fishing, Ice Wells for picnicking. Morning Star Drive Lookout is a scenic outlook. Undeveloped sites include Badger Peak Tower, Black Spring Lookout, and Buffalo Jump, all of which are scenic outlooks. In addition, three fishing ponds lie near Busby: LaFever, which is privately owned, Red Nose, and Parker (NCPO, August 1981, p. 79).

Seventy percent of the households surveyed on the reservation actively use the developed recreation areas. Of these families, 70 percent use Crazy Head Springs, 30 percent use Green Leaf and Ice Wells, and about 25 percent use Morning Star Lookout (NCPO Survey, 1981). Use of the reservation for recreation by nonresidents and nontribal members is primarily for fishing. Use by this group has remained about the same since 1975 (NCPO Survey, 1981).

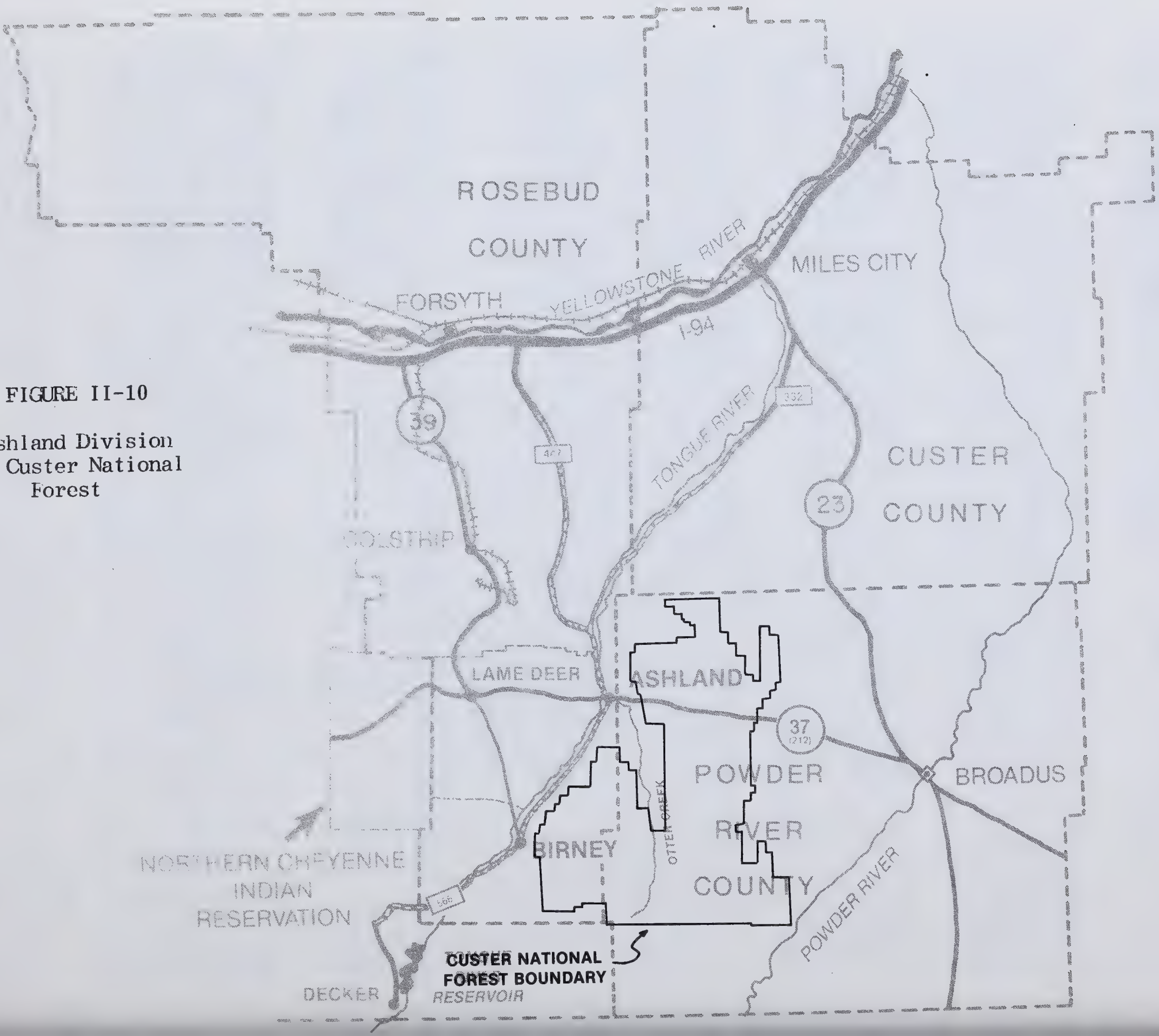

FIGURE II-10

Ashland Division
of Custer National
Forest

Opportunities for picnicking, fishing, solitude, family activities, swimming, and church gatherings are an important part of the Northern Cheyenne lifestyle (NCPO, December 1981, p. 3). Forty percent are not satisfied with their present opportunities for recreation (NCPO Survey, 1981).

Participating in pow wows was the most frequently mentioned recreational activity among the Northern Cheyenne interviewed in a DSL survey; 75 percent attend. Sports are also popular; 21 percent of the households interviewed participate. Family gatherings and community activities are next in popularity. (NCPO Survey, 1981).

Local government owns additional facilities. Forsyth owns three outdoor ice rinks, one golf course, and three picnic areas. Combined, Forsyth and Colstrip own nine tennis courts, eight ball fields, twelve playgrounds, and two outdoor pools. Colstrip also owns three basketball courts. These facilities in Colstrip are dedicated to public use and are managed through the Colstrip Area Recreation and Parks Association, which is largely funded by the operating companies at Colstrip.

Privately owned developed recreation sites include a shooting range owned by the Colstrip Rod and Gun Club; a tennis court, basketball court, and handball court owned by Colstrip Units 3 and 4 and managed by the Burtco Company; and the Wagon Wheel Campground, which is also used for fishing and camping.

Colstrip's recreational facilities and park acreage are currently above the minimum suggested by population-based standards and will be adequate for long-term demand. In the short-term, however, a temporary shortage of three park acres, one acre of playground area, and one softball field is forecast to occur between 1982 and 1984, during the Colstrip Units 3 and 4 work force population influx.

The city of Broadus has one-half acre of developed park land. Long-term demand will require this to double.

People in the Ashland-Birney area prefer outdoor activities. In the DSL survey (1981), fishing was the most popular activity mentioned, followed by rodeo, horseback riding, and hunting. Visiting, watching television, picnicking, dancing, and card playing were also mentioned frequently.

The only developed facilities in Ashland are the playground and gym at the elementary school. There is no organized community recreation program. The lack of recreation was mentioned by residents in the Ashland-Birney area as a problem (DSL survey and informant interviews).

CULTURAL RESOURCES

Summary: Sixty-two cultural properties were inventoried in the course of cultural resource surveys in the Montco Mine plan area and a one-mile buffer zone around the plan area. Twenty-two of these sites, 18 prehistoric and 4 historic, were judged to be eligible for listing in the

National Register of Historic Places and lie within the area of potential impact. The remaining 39 sites were either judged to be ineligible for Register listing or not likely to fall within the impact area. One additional site located on the Northern Cheyenne Reservation may also be eligible for register listing.

The information in this section is drawn from reports by Robert S. Waldman (1979) Historical Research Associates (1980), and Marcella Sherfy (DSL on-file report, 1982).

Prehistoric Sites

The factors contributing to the significance of the 18 prehistoric sites thought to be eligible for listing in the National Register are summarized in table II-27, which cross lists each of the eligible properties mentioned here with the inferred period of occupation. All listed archaeological sites are significant because they have yielded, and may be likely to yield, important information in the study of Montana's prehistory.

The 18 prehistoric sites fall into two categories. Nine of the sites are probably the remains of domestic activities by members of prehistoric communities. They are characterized by the presence of a wide variety of artifacts and in some cases stone features and animal remains. All are believed to possess important undiscovered information on community-wide residential activities.

The remaining nine prehistoric sites are the remains of specific activities of prehistoric communities. The activities inferred from tools collected include selecting and testing chipped stone materials and killing and butchering relatively large ungulate game. There are two exceptions in this group of nine. The first includes what is presumably the site of vision-questing activities. The second is the location of a prehistoric parietal rock art complex that possesses high artistic values that distinctively characterize a culture type and period. These nine sites are all believed to have the potential to contribute information on Great Plains prehistoric economics and culture.

Historic Sites

Of the four historic properties considered eligible for listing in the National Register of Historic Places, three are associated with an early twentieth century (1910-1930) period of permanent white settlement in the Tongue River Valley. Each is a good illustration of patterns in the disposition of public lands, of farming practices and needs, of individuals important in early area affairs, and in building construction and farmyard arrangement. All three possess a high degree of site integrity. A fourth site is associated with the earliest white settlement of the area (late 19th century) and is important as a rare surviving example of that era. A fifth site may also be eligible but has not yet been officially determined eligible by the keeper of the register. This site (24RB164) represents an early attempt by the Bureau of Indian Affairs to acculturate the Northern Cheyenne.

TABLE II-27

Sites Eligible for the National Register of Historic Places

Site Number	Site Name	Location	Period
Prehistoric			
24RB215	Yellow Leaf	Buffer zone	Late Plains/Late Prehistoric
24RB221	King Creek	Permit area	Late-Middle Plains
24RB226	Katydid	Permit area	Late Plains
24RB230	Airport	Buffer zone	Paleo/Middle-Late Plains/Late Prehistoric
24RB232	Jamie's	Mine plan area	Late Plains
24RB233	Little Bone	Mine plan area	Late Plains/Late Prehistoric
24RB246	Bright Cloud	Mine plan area	Later Prehistoric
24RB248	Iron Graveyard	Mine plan area	Late Plains
24RB251	Autumn View	Buffer zone	Late Prehistoric
24RB211	Roof of the Tongue	Buffer zone	unknown
24RB212	Scatter	Buffer zone	Late Plains
24RB228	Lost Grave	Mine plan area	unknown
24RB229	Thru Rock Ring	Mine plan area	unknown
24RB223	Fence Line	Permit area	unknown
24RB234	O'Dell Bison Jump	Mine plan area	Late Prehistoric
24RB249	Amid Creek	Buffer zone	unknown
24RB275	Spirit Rock	Buffer zone	unknown
24RB217	Broken Tire	Mine plan area	Late Plains/Late Prehistoric
Historic			
24RB153	Byers/Schaudel Homestead	Buffer zone	1910-1930
24RB155	Jud McKelvey Homestead	Buffer zone	1910-1930
24RB158	Cotant/Scott Homestead	Buffer zone	late 1800s
24RB168	Karl Knobloch Homestead	Mine plan area	1910-1930

AESTHETICS

Summary: The Montco Mine plan area covers a pastoral landscape typical of southeastern Montana.

The proposed mine plan area has no unusual scenic qualities and is similar to other scenes along the Tongue River to the north and south. Intrusion by man is limited to farming and grazing activities. The area varies topographically from the alluvial valley floor of the Tongue River to the west to gently rolling hills, plateaus, and sandstone outcrops to the east. There is moderate variety of color, including scattered patches of dark green pine trees, red scoria and tan sandstone. Vegetation produces variations in patterns and textures. The predominant odors are those of the vegetation. Sounds are from vehicle traffic on the Ashland-Birney gravel road, livestock, wildlife and wind.

Chapter III

IMPACTS OF THE PROPOSAL

This chapter covers 19 topics, presenting subject by subject the impacts that could be caused by the Montco Mine. At the start of each topic is a summary of the major impacts anticipated to be caused by the mine. Following the summary is a detailed discussion of the impacts. Each section ends, when appropriate, with a list of "mitigating measures," or actions that could be taken to reduce or eliminate the mine's projected impacts. The reader is reminded that changes made since the draft EIS have been underlined (with the exception of changes in Soils and the Overburden section of Geology).

GEOLOGY

Summary of Impacts: Geologic impacts of mining in the North King mining unit would be limited primarily to largely unavoidable erosion of topsoil from the longer and steeper reclaimed slopes. Reclamation over the remainder of Montco's mine plan area would probably cause similar geologic impacts, although this cannot be determined for certain at this time.

Adequate favorable overburden exists in the North King unit to cover the regraded spoil to a depth of 8 feet. Montco's overburden handling plans would most likely allow for adequate separation of favorable from unfavorable overburden. It is possible that unfavorable overburden materials could still end up in the rootzone in relatively small, localized areas, and this could affect postmining vegetative quality. However, Montco could be required to correct such areas, depending on their size and extent.

Topography and Geomorphology

Geomorphic impacts within the North King unit would be minor, although some related impacts may be moderate. (see Hydrology and Soils). The postmining topographic plan submitted by Montco (fig. III-1) depicts a geomorphic surface which should be stable in a well-managed, postmining environment. Some planned hillslopes are steeper or longer than is ideal, but the necessity to match undisturbed and reclaimed surfaces makes this generally unavoidable. Some erosion and topsoil loss would be unavoidable. Overall, sediment yields under postmining conditions are expected to be at least comparable to premining conditions, assuming proper management following reclamation.

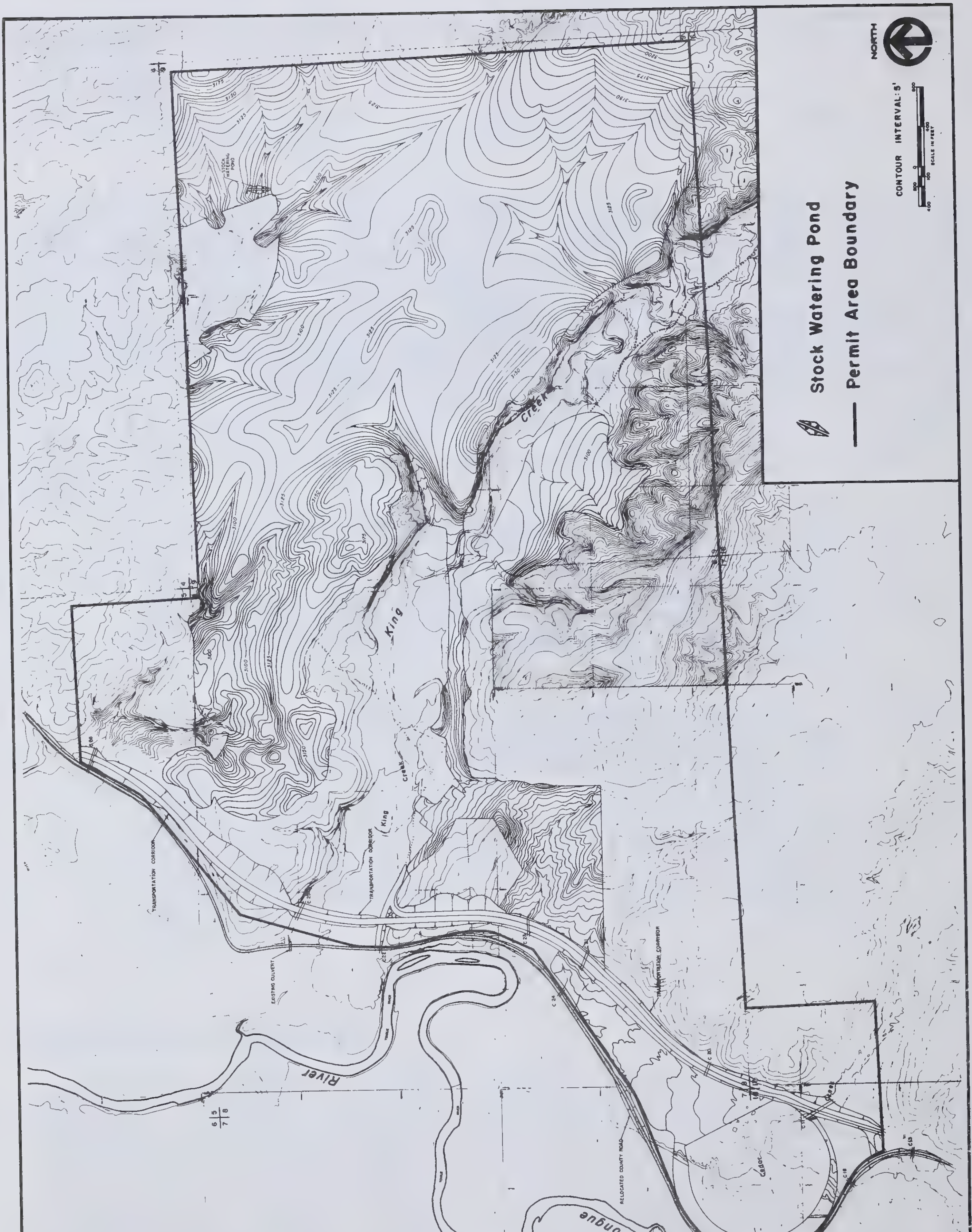

FIGURE III-1--Postmining Topography

Mineral Resources

Approximately 25.5 million tons of coal would be mined from approximately 502 acres within the North King unit. The mine plan area calls for approximately 186.1 million tons of coal to be mined from about 5,322 acres of total mining and associated disturbance over a 22-year period. Coal mined from the North King mining unit and the mine plan area constitute about 12 and 85 percent, respectively, of the in-place coal resources estimated for the Montco Mine.

Additional Geologic Impacts

The existing stratigraphy down to the lowest coal seam would be replaced by a mixture of broken overburden and interburden (spoil). This stratigraphy is not unusual or rare. No significant paleontological resources are known to exist in rocks that would be mined or disturbed.

Mining would not interfere with development of other minerals or resources in the area, nor would mining likely create any geologic hazards.

Overburden

[Note: This entire section, Overburden, has been revised.]

Overview--Montco Mine Plan Area

Montco's overburden samples were analyzed for 28 physiochemical characteristics. Of the 28, sodium content and clay content are the most likely to cause reclamation problems. When at high levels in overburden, sodium disperses clay particles, creating poor overburden structure, which reduces water permeability and discourages root penetration. High sodium levels can also cause surface crusting. High clay content can similarly cause poor permeability and root penetration. If the overburden contains elevated sodium and clay together, the problem is greatly compounded. If sodic or clayey material ends up in the rootzone, adequate revegetation would be difficult.

Occasionally, overburden throughout the mine plan area has other characteristics that can hamper reclamation: high electrical conductivity (EC--a measure of soluble salts, or salinity), unsuitable saturation percentages (an indication of water-holding capacity and, to some extent, the presence of swelling clays), and excess molybdenum, primarily in the South Gate mining unit. (See table II-4.)

Elevated soluble-salt content (EC) in the rootzone requires plants to use more metabolic energy to take up water, at the expense of stored food reserves. Elevated EC levels occur only in isolated, thin strata, expected to be mixed with other strata and diluted during handling (excavation, stockpiling, backfilling, and regrading). The dilution of the saline zones would reduce or eliminate the salts' adverse effects on reclamation.

Actual clay mineralogy analysis (by x-ray diffraction) was performed on samples from two holes--one in the North King and one in the South O'Dell mining units. All samples proved to be dominated by illite and kaolinite--nonswelling clays--and no smectite was detected.

Generally, a saturation percentage above 85 indicates the presence of smectite (swelling clay). Like high levels of sodium and clay, smectite can greatly reduce water permeability, root penetration, and cause surface crusting. Saturation percentages over 85, although uncommon, are found sporadically in some strata of the northern mining units; high saturation percentages become more prevalent in the southern mining units, especially South Gate.

At low saturation percentages, water-holding capacity is poor and droughty conditions can occur. Saturation percentages below 25, indicating material considered unsuitable for plant growth, are rare in the mine plan area. However, an overabundance of large rock fragments in the overburden could also be conducive to droughty conditions.

Molybdenum concentrations are low in all mining units except South Gate, where about one-third of the overburden samples contained concentrations at or above the upper suspect level of 1.0 part per million (table II-4). This potential problem is discussed later in this section.

Table III-1 lists the quantity of favorable overburden in the mine plan area. Based on average thicknesses, it appears that all mining units have enough favorable material for an 8-foot buffer zone (rootzone) at the surface of the regraded spoil (as required by ARM 26.4.506). Note, however, that only the holes analyzed for geochemistry data were used in the table. More drill hole information and/or extrapolation between geochemical and exploration holes would be needed to accurately delineate the areal extent of the favorable material. The average thicknesses given may represent only certain areas (near the drill holes), not entire mining units.

An exception to the inadequacy of drill hole information is the North King unit. Here, data from 22 geochemical drill holes (table III-1) were added to data from 44 exploration drill holes extrapolated back to the first 22 holes for chemical and physical characteristics. This analysis resulted in an average favorable overburden thickness similar to the 46.3 feet given in the table. (For an explanation of how overburden was correlated and extrapolated from tested to untested drill cores, see Montco [1983] appendix N, supplement N2.)

North King Mining Unit--Proposed Permit Area

Enough favorable overburden lies in the North King mining unit for an 8-foot rootzone. (See table III-1.) To separate favorable from unfavorable material in the field, Montco would use favorable-overburden isopach and structure maps. These maps were drawn using all drill hole information, from both overburden geochemistry holes and exploration holes. Untested holes were correlated with tested holes using geologists' logs, color, lithology, clay content, and topography.

TABLE III-1

Favorable Overburden Available in The Montco Mine Plan Area

Core	Depth(s) (feet)	Total Thickness (feet)
North King Mining Unit		
4449-1	5-40	35
4449-2C	20-40	20
4449-3C	0	0
4449-4C	20-40	20
4449-5C	0-10, 25-35	20
4449-6C	0	0
4449-7C	0-90	90
4449-70BC	12-95	83
4449-8A	35-55, 65-100, 110-140	85
4449-11A	0-145	145
4449-12D	10-90	80
4449-13A	0	0
4449-14A	55-65	10
4449-16B	0-30	30
4449-16D	0-25	25
4449-17B	25-125	100
4449-19W	0-40, 45-65, 85-130	105
4449-20	0-150	150
4449-21	0	0
4449-22	0	0
4449-23C	30-40	10
4449-26C	175-185	10
	Average thickness	46.3
South King Mining Unit		
44416-1	20-45, 60-70	35
44416-1C	19-49	30
44416-4	0	0
44416-14	15-25, 30-45, 55-125	95
44416-15	0-20, 35-50, 160-240	115
	Average thickness	55.0
North O'Dell Mining Unit		
44429-1C	0	0
44431-3C	0	0
	Average thickness	0
South O'Dell Mining Unit		
44431-OW1	10-75	65
44431-5C	10-40	30
44431-7C	5-45	40
South O'Dell Mining Unit (cont.)		
44431-10	0-20	20
44431-12	220-255	35
44431-13C	25-35, 40-60	30
44336-4C	0	0
44336-40BC	20-60	40
44336-5RC	55-65	10
44336-8	0-85	85
44336-10C	0-40	40
44336-11C	0	0
44336-16C	0	0
44336-18	0-15, 20-35, 280-290	40
44336-20	0-15, 20-40	35
44335-3C	15-85	70
44335-5C	0-15, 85-105	35
44335-8RC	20-30, 35-75, 80-90	60
	Average thickness	35.0
South Gate Mining Unit		
3643-E	22-30	8
3645-E	0	0
3646-E	0	0
3647-E	0-20	20
3648-E	0	0
3649-E	20-45.6	25.6
3650-E	0-10, 86.2-106.2	30
3651-E	0	0
3653-E	20-32.8	12.8
3654-E	40-50	10
3655-E	6.4-27.5	21.1
3656-E	10-24, 26-42.2	30.2
3657-E	0	0
3658-E	0	0
3659-E	0	0
3660-E	0	0
3662-E	0	0
3663-E	0-34	34
3664-E	0	0
54310-1C	0	0
54317-4RC	0-15	15
54320-2C	0	0
	Average thickness	9.4

Source: This table was extrapolated from data in appendix N of the Montco (1983) permit application.

Note: Suitability is based on the criteria given in table II-4. Only the cores with geochemistry data available were used for this table. Favorable core increments of less than 10 feet were not considered because thin, isolated overburden strata would be impractical to excavate separately.

The favorable isopach maps show the thickness of favorable material, indicated by lines added to a topographic map. A line marked "40," for example, indicates 40 feet of favorable material at some interval in the profile. The structure maps, similar in design, indicate the bottom elevation of the favorable material. Together, the two maps can be used to locate zones of favorable overburden. For example, assume point "A" on the isopach map falls on a line marked 70, and the same location on the structure map falls on a line marked 3,020 feet. Since 3,020 feet is the bottom elevation of the favorable zone, 3,090 feet would be the top (3,020 + 70 = 3,090).

Montco would have a field scientist use these maps to stake mining areas with elevation information. Shovel operators would locate favorable material based on the shovel's elevation and the elevation ranges given on the stakes.

To test the adequacy of the isopach maps, four additional cores in the North King unit were analyzed. Montco's consultants then estimated the statistical accuracy of overburden quality data for electrical conductivity and sodium adsorption ratio (SAR, an indicator of sodium hazard). Using the 22 geochemically tested drill holes, the accuracy was calculated by Montco to be 78.5 percent for EC and 65.5 percent for SAR. By adding the data of the 44 exploration drill holes extrapolated to the 22 tested cores, the accuracy increased to 87.5 percent for EC and 80.5 percent for SAR. The estimated overall accuracy for EC and SAR together is therefore about 80 percent. (For a detailed explanation of the statistical procedures used and results obtained, refer to appendix 8.) The accuracy analysis shows that the isopach maps are generally accurate and, in fact, somewhat conservative in that more favorable overburden is sometimes present than the maps indicate.

At 80 percent accuracy, a 20 percent chance of error remains that Montco would place unfavorable material in the rootzone. This chance of error would be reduced by Montco's program of sampling replaced and regraded spoil. The program calls for taking one 8-foot sample (2 increments of 4 feet each) for about every 2 acres of regraded surface. The samples would be analyzed for pH, EC, SAR or ESP, and texture. If unfavorable material is found, Montco could be required to rework the area, burying unfavorable material under 8 feet of favorable material.

Despite Montco's overburden handling and sampling plans, some unfavorable material could still end up in the rootzone. Small areas of stunted plants or sparse vegetation could result. Such problems, however, are not expected to be widespread and could be corrected.

Soluble salt levels are slightly elevated in only a very few overburden sample increments in the North King unit. The salts would most likely be diluted during overburden handling. Soluble salts should therefore not lower the quality of the postmining rootzone.

Saturation percentages are mostly moderate; no extreme values appear in the data. This indicates that water-holding capacity is generally adequate (except to the extent that an overabundance of large rock fragments occurs in the overburden), and no swelling clays are present, at least not in potentially harmful amounts. All trace element concentrations are low, and no toxicity is expected, owing to the alkaline environment.

South King Mining Unit

From the few samples taken (five drill holes comprising 154 sample increments), it appears that the moderate to high sodium content is the most likely factor to create rootzone problems during reclamation. However, table III-1 indicates that more than enough favorable material is available for the 8-foot rootzone. More drill holes would be necessary to delineate the favorable material. Overburden isopach and structure maps are recommended to increase the accuracy of favorable-overburden recovery.

North O'Dell Mining Unit

To date, samples from only two drill holes have been analyzed from the North O'Dell unit. From such limited data, the overburden appears highly sodic, moderately to highly saline, high in clay content, and often with saturation percentages greater than 100, and sometimes 200. The greatest limiting factor is the high sodium content, found in almost every sample increment.

One trace element, boron, exceeds the suspect level of 5.0 parts per million (ppm) (table II-4) about a third of the time. Commonly, hot-water-soluble boron values below 1 ppm are considered marginal for boron-sensitive crops, while levels greater than 5 ppm are considered toxic (Severson and Gough, 1983; Reisenauer et al., 1973). More drilling and chemical analysis would determine the extent of unfavorable boron levels. If high boron levels appear widespread, the element may have to be added to the regraded-spoil sampling program. Another possibility may be to use the electrical conductivity/hot-water-soluble boron relationship discussed by Severson and Gough (1983) as a guide in predicting boron concentrations in the postmining rootzone.

Concentrations of trace elements other than boron are low, and no toxicity is anticipated, owing to the alkaline environment. After adequate sampling, analysis, and exploration, all information should be used to construct favorable-overburden isopach and structure maps for use in reclamation.

South O'Dell Mining Unit

The main concern over reclamation in the South O'Dell mining unit is sodicity. Of far less concern are high clay content and high saturation percentages. Salinity and boron concentrations exceed suspect levels about one-tenth of the time, but should be diluted enough during overburden handing to alleviate most problems. Other trace element concentrations are low and toxicity is not expected under the prevailing alkaline conditions.

Based on only the geochemical drill holes, the South O'Dell unit has an average of about 35 feet of favorable material (table III-1). When more drill holes or correlations with exploration holes supply data to accurately delineate the favorable material, isopach and structure maps should be drawn and used during reclamation.

South Gate Mining Unit

Excess sodium appears widespread in the South Gate mining unit. Other characteristics of concern, in order of decreasing importance for this mining unit, are high molybdenum levels, high saturation percentages (over 85 and often over 100, sometimes over 200), elevated clay contents, and moderate to high soluble salts (EC).

Elevated molybdenum levels can pose a unique problem after mining. Molybdenum is rarely toxic to plants, but has been known to cause a copper:molybdenum imbalance (molybdenosis) in cattle and sheep that graze on plants containing high levels of molybdenum. The critical factor is the ratio of available copper to molybdenum in the forage. The ideal copper:molybdenum ratio is about 6:1 (Dollahite et al., 1972), and researchers generally agree that ratios below 2:1 in forage can be expected to cause copper deficiency symptoms (Miltimore and Mason, 1971; Dollahite et al., 1972; Erdman et al., 1978). Elevated molybdenum levels can pose a unique problem after mining.

Unfortunately, using soil copper to molybdenum ratios is useless as an indicator of what can be expected in the forage. Neuman and Munshower (1983) found at the Big Sky Mine near Colstrip that leguminous plants (e.g., sweetclover, alfalfa) exhibited positive correlations between the level of molybdenum in the soil and the level in plants; however, the correlations were statistically significant in only a few cases. The correlation was much lower when a native, nonleguminous grass species was used. Moreover, there were few or no correlations using the same plant species when comparing copper levels in the soil with copper levels in plants.

Considering the uncertainty of molybdenosis occurring in ruminants grazing on reclaimed lands known to contain elevated levels of molybdenum, Montco would have to thoroughly address this issue when applying for a permit to mine in the South Gate Unit. Mitigation measures would need to be addressed in the company's reclamation plan for this unit.

The average thickness of favorable overburden material in the South Gate unit is 9.4 feet (table III-1). One possible reason why there appears to be little favorable material in this unit could be the drilling pattern used. In the mid- to late 1970s, when the South Gate holes were drilled, the emphasis was on coal exploration, not on overburden availability. All South Gate holes were therefore drilled over unburned coal beds, generally where one expects to find a fair amount of unfavorable overburden. If the South Gate unit is mined, a more comprehensive overburden drill-hole sampling pattern would first have to be established, followed by drilling, and sample analysis. Data from the new holes, along with existing data, could then be used to construct favorable-overburden isopach and structure maps. An accurate prediction of the quantity of suitable overburden could then be made.

Other Issues

Overburden stockpile. North King mining unit overburden would be segregated into three qualities: favorable, moderately favorable, and unfavorable. (The moderately favorable material has some characteristics of both the favorable and unfavorable materials--see table II-4.) Although Montco would not use moderately favorable material for the rootzone of the North King unit, the material is being segregated to use in research plots. Although not yet officially proposed, the plots would indicate whether the marginal material is suitable for a rootzone growth medium in future mining units.

Initially, there would be three separate overburden piles. The moderately favorable pile would be placed between the favorable and unfavorable piles. By year 5 of mining, all overburden types would merge, forming one large stockpile (figure I-3). Some mixing would then occur. Montco estimates that the zone of mixing would be no more than 150 feet wide. The company would not take the overburden in this area when retrieving favorable material for the reclaimed rootzone.

Quality of burn material. Although burn material (porcelanite, scoria, clinker) seems to be suitable chemically, the Department and the public have questioned the ability of the material to hold water. The appearance of burn outcrops suggests that such material would hold little water. To address this concern, Montco had a commercial laboratory analyze material from a hole taken within the burn zone. The lab determined percent coarse fragments and saturation percentages on all increments from the hole. In addition, percent available water was determined on every other sample increment. (See table III-2; compare saturation percentages with table II-4.)

The results given in table III-2 are surprising. One would expect much lower saturation percentages and available water in burn material with such high coarse fragment contents. Some questionable increments (e.g., the 20-25 foot increment with 41.2 percent fragments and a saturation percent of 120.6) were analyzed a second time, but the results remained the same.

When comparing saturation percentages and percent available water, a few of the sample increments appear somewhat inconsistent. For example, the 50-55 foot increment has a saturation percentage of 115.0, indicating a high water-holding capacity; however, the same increment has 9.1 percent available water, which is rated as "medium" (Montagne et al., 1982). The 70-75 foot increment has a saturation percentage of 57.3, indicating a medium water-holding capacity; however, the same increment has 26.4 percent available water, which is rated as "very high." The reasons for these apparent discrepancies are unknown. When the saturation percentages are high, it is often difficult to accurately reach the endpoint during the laboratory procedure. In addition, the presence of coarse fragments may have interfered with the laboratory analysis to some extent. All of the data presented in Table III-2 do, however, indicate that the burn material from the drill hole would be suitable for a postmining rootzone.

To date, there has been little or no research on the water-holding capacity of burn materials in the form they would resemble in the field. Laboratories normally grind overburden samples (including burn material) for the

TABLE III-2

Overburden Physiochemical Characteristics
For a Drill Core (4449-27C) in Burn
Material in the North King Mining Unit

Overburden Depth Increment (feet)	Percent Rock Fragments (over 2 mm)	Saturation Percentage	Percent Available Water[1]	Plant Available Water Rating[2]
0-5	1.0	58.4	14.7	high
5-10	95.2	31.1		
10-15	2.2	50.7	10.6	medium
15-20	6.0	55.6		
20-25	41.2	120.6	12.0	high
25-30	18.8	59.2		
30-35	16.3	94.5	13.6	high
35-40	29.3	105.8		
40-45	46.5	95.4	20.5	very high
45-50	69.0	85.2		
50-55	48.2	115.0	9.1	medium
55-60	33.3	53.9		
60-65	50.7	52.6	9.8	medium
65-70	44.9	46.3		
70-75	50.1	57.3	26.4	very high
75-80	62.2	52.2		
80-85	6.3	39.2	10.1	medium
85-90	50.5	62.3		
90-95	64.3	62.3	--	--
$\overline{X}$	38.7%	68.3%	14.1%	high

Source: Montco, 1983 [Dollhopf and Intrasearch, Inc., 1983, appendix N, supplement N2 of the Montco permit application.]

Note: Increment samples were split into two parts. For rock fragment determination by dry sieving, one part of the split sample was first disaggregated with a mortar and rubber-ended pestle. For determination of saturation percentage and available water, the other part of the split sample did not undergo any sample preparation (i.e., no forced disaggregation; the test was performed directly on field sample).

[1] A modification of the pressure-membrane method [U.S. Department of Agriculture, 1954, p. 88-89].

[2] Rating system based on Montagne et al., 1982, p. 88.

(--) indicates no data available.

purpose of chemical analysis. Obviously, grinding prevents accurate measurement of saturation percentages. The data in table III-2 were derived from an unground sample, which more closely approximates the actual field material (with the exclusion of large rock fragments). Although more research is needed, it is known that the outcrop is not representative of all burn material. The hottest burn took place at the outcrop, where the coarsest material usually remains. Fines (less than 2 mm) generally increase as you move inward from the outcrop, where less oxygen was available and therefore the burn was much less severe. This, in turn, affects the physical nature of the material. Burn deposits are discussed further by Woessner et al. (1978, pages 69-73).

Without further research, the saturation percentages and available water values in the table cannot be explained with certainty, but they may be a product of one or more of the following:

- Most fines (less than 2 mm) may consist of medium to very fine sands, silts, and clays.
- The coarse fragments (greater than 2 mm) being somewhat porous, may absorb some water (like a sponge), and adsorb water on their surfaces (by adhesion), a phenomenon observed at Colstrip (Schafer et al., 1979, pages 70-73).
- Some of the coarse fragments may slake (break down) when wetted, increasing the surface area of the material.
- Any clay present could include smectite (swelling clays), which would hold far more water than other particles.
- Enough sodium could be available to disperse any clay particles present, increasing moisture-holding capacity. However, sodium levels are generally low in burn material.

Whatever the reason, the material taken from the burned strata represented by this analysis would be suitable for a postmining rootzone, except to the extent that an overabundance of large rock fragments may occur. Since large rock fragments are usually less abundant in lightly burned material (as opposed to severely burned material), Montco could selectively handle the burn material so that only that which has been lightly burned is placed in the rootzone. (See Mitigating Measures.)

Unfortunately, data similar to that in table III-2 are not available in all burned areas in the North King unit. However, since all overburden in the unit is geologically similar, it is reasonable to assume that each degree of burn material is also similar throughout the unit. Some variability can be expected, so material with low water-holding capacities could still end up in the rootzone. Droughtiness may thus arise in some areas. If so, Montco could be required to replace the overburden with suitable material. (See Mitigating Measures.)

Postmining landscape stability. Groenewold and Rehm (1980) observed three distinct types of landscape instability at dragline mining operations in North Dakota: (1) area-wide settling; (2) localized subsidence or collapse; and (3) piping. Since Montco is proposing a truck-shovel method, rather than a dragline method, only area-wide settling is expected after reclamation. A truck-shovel operation leaves a more stable landscape because a significant amount of compaction occurs in the overburden lifts.

Area-wide settling occurs at almost every surface mine. The spoil (overburden), having been blasted and handled, tends to settle after replacement and regrading. This type of settling appears to disrupt the landscape very little, generally during only the first 12 to 15 months after regrading. Often, area-wide settling goes unnoticed because of its subtleness. If postmining drainages settle unevenly, however, nick points may form, which could initiate gully erosion. The nick points would be observed during regular mine inspections, and the company would be required to eliminate them.

Mitigating Measures

As proposed for the North King mining unit, the data from other units should be converted into favorable-overburden isopach and structure maps. This would require more drilling, core analysis, and extrapolation to other holes.

Based on limited data (2 holes) in the North O'Dell unit, boron exceeds the suspect level of 5.0 ppm (table II-4) about a third of the time. Further drilling would determine the extent of the elevated boron. If boron levels prove high after adequate sampling, the element may have to be measured during sampling of regraded spoil. Another possibility would be to use the electrical conductivity/hot-water-soluble boron relationship discussed by Severson and Gough (1983) as a guide in predicting boron concentrations in the regraded spoil.

Since large rock fragments are usually less abundant in lightly burned material, Montco could selectively handle and place only the lightly burned material in the rootzone. This would help prevent droughtly situations from occurring on the postmining landscape.

Montco's soil specialist could examine regraded burn materials while conducting the postmining spoil sampling program. If any material appears to have a low water-retention capacity based on burn intensity, texture, and coarse fragment content, saturation percentage analysis (or better yet, percent available water) could be performed on a few samples. Droughty material could then be replaced, reducing the possibility of low water-holding capacities in the rootzone.

HYDROLOGY

Summary of Impacts: Montco's surface drainage control plan may allow some surface runoff and sediment to leave the permit area during initial mining and operation phases in the North King unit in response to extreme runoff. Impacts would be localized and short term.

Sandstone units known to overlie and underlie coal seams in the North King unit may cause initial pit inflows greater than those calculated from the coal seams. In such instances, discharges from ponds designed to treat pit pumpage may not meet water quality standards.

Reestablishment of the ground water flow regime through spoil following mining may eventually cause increased dissolved solids concentrations in Tongue River streamflow. Theoretical increases during low flow conditions could probably not be measured due to mining the North King unit, and increases due to mining Montco's entire mine plan area also could not be measured in the river. Streamflows greater than low flow conditions would effectively dilute increases even more. Cumulative hydrologic impacts resulting from mining by Montco, in conjunction with mining above the Tongue River Dam, would therefore have no adverse impacts on agricultural water uses.

Neither mining in the North King unit nor construction of the facilities or railroad loop would result in measurable impacts on the Tongue River hydrologic system. McKelvey Spring may dry up as a result of mining the North King unit. It is uncertain whether it would flow again following reclamation.

Extreme flood flows in King Creek could damage a sediment pond. The railroad loop embankment, however, would be above projected flood water level elevations and would not be affected.

Ground water quality in resaturated, backfilled spoil would probably be degraded. However, alternative ground water sources exist in the area.

Surface Water

Sediment and Runoff

Montco's surface drainage control plan for the North King unit may allow a minor amount of runoff and sediment to discharge downslope or downstream, beyond the permit boundary. Runoff from all surfaces in the region occurs only in response to rainstorms and spring snowmelt, the timing and intensity of which are largely unpredictable. Runoff events may occur frequently in a given year, or may not occur at all.

No assessment of drainage control adequacy can be made for the remainder of Montco's 24-year mine plan area until Montco submits future mine plans.

Dissolved Solids Loads in the Tongue River

Following completion of mining and reclamation, the local ground water system would reestablish and the spoil would resaturate. Ground water would move from the spoil, through adjacent undisturbed bedrock and clinker, and discharge directly or indirectly to Tongue River alluvium. This ground water might ultimately contribute to Tongue River surface flow. Accordingly, increased dissolved solids in spoil ground water would eventually contribute to dissolve solids loads in Tongue River streamflow. Detailed discussion of potential mining impacts to the Tongue River are contained elsewhere in a report by Woessner et al. (1981) and in a petition evaluation by Montana Department of State Lands and U.S. Office of Surface Mining (1982).

Based on two approaches and assumed "worst case" postmining hydrologic conditions, completion of all mining proposed by Montco would cause dissolved solids concentrations in the Tongue River at low flow to increase by, at most, two or three percent. Under higher streamflow conditions, increases in dissolved solids concentrations would be immeasurably small. A brief description of these approaches follows.

(1) Montco calculated and submitted estimates in its application that dissolved solids concentrations in the Tongue River alluvium down-gradient from the North King unit would increase by less than two percent, and increase in the Tongue River low streamflows by approximately 0.1 percent. These values are within the margin of error inherent in water quality laboratory measurement techniques and are insignificant. Extrapolation of these results under assumed similar conditions for approximately 5,500 acres of mining over the life of the mine yields an estimated increase in Tongue River low flow dissolved solids concentrations of less than one percent. This is also an insignificant increase.

(2) Using a quantitative model described by Woods (1981) and reasonable assumptions and estimates of premining hydrologic conditions, dissolved solids concentrations in Tongue River low flow would increase by less than one percent from mining the North King unit and by about three percent under the entire 24-year mine plan. See appendix 5.

Additional analyses were undertaken for this final EIS to assess dissolved solids concentrations that could result from mining by Montco in the North King unit and in the entire mine plan area (Stiller & Associates, 1983 and 1984). These analyses rely on the same computer model (Woods, 1981) used in the Tongue River petition evaluation (DSL and OSM, 1982). Various levels of mining and irrigation are assumed for these analyses. (See table III-3.)

Results of these analyses are presented in table III-4 Scenario B represents computer-simulated conditions resulting from mining Montco's North King unit; scenario C represents mining of the entire plan area. Comparison of predicted ranges of dissolved solids concentrations for scenarios B and C with those representing present conditions, scenario A, indicates that impacts to water quality in the Tongue River would be insignificant.

Thus, an estimate provided by Montco and two estimates calculated using another model (Woods, 1981) predict no impacts to Tongue River water quality

TABLE III-3

Development Scenarios Assumed for Hydrologic-Computer Simulations

Scenario	Level of Mining Below Tongue River Dam (in acres)	Level of Irrigation in Tongue River Valley Below Dam (in acres)	Mining Assumed Above Tongue River Dam	Comments and Description
A	0	14,200	No	Present conditions; mining above Tongue River Dam has not influenced river water quality yet.
B	566	14,200	No	Impact of mining Montco's North King mining unit on present conditions.
C	5,455	14,200	Yes	Montco's mine plan area impacts on present conditions.
C[1]	7,193	14,200	Yes	Same as C above, plus adjacent unleased federal coal.
D	24,485	14,200	Yes	Montco's mine plan area impacts, plus those of "all anticipated mining," on present conditions.
E	5,455	21,200	Yes	Montco's mine plan area impacts, plus those of increased irrigation in the Tongue River Valley, on present conditions.
E[1]	7,913	21,200	Yes	Same as E above, plus adjacent unleased federal coal.
F	24,485	21,200	Yes	Montco's mine plan area impacts, plus those of "all anticipated mining" and increased irrigation in the Tongue River Valley, on present conditions.

Source: Stiller and Associates, 1983 and 1984.

TABLE III-4

Predicted Water Quality for Eight Development Scenarios in the Lower Tongue River Valley

	Scenario (Total Dissolved Solids in mg/1)[1]							
Flow Condition[2]	A	B	C	C[1]	D	E	E[1]	F
Historical Mean Discharge								
Reach 2[3]	286-523	286-523	291-530	291-530	291-530	294-537	294-538	294-537
Reach 3	305-560	305-560	310-565	310-565	311-592	316-649	316-649	317-654
Reach 5	320-718	327-718	332-746	332-747	333-752	345-963	345-964	356-970
Minus 1 Standard Deviation from Mean Discharge								
Reach 2	Not	320-553	333-568	Not	333-568	333-587	Not	342-587
Reach 3	Run	368-617	381-647	Run	383-655	402-701	Run	405-710
Reach 5		434-769	448-816		451-824	507-979		510-988
Historical Low Flow								
Reach 2	405-676	405-676	453-717	Not	453-717	510-768	Not	510-767
Reach 3	539-868	539-868	592-909	Run	603-918	790-1076	Run	801-1086
Reach 5	998-1881	998-1881	1067-2029		1080-2059	--[4]		--[4]
Synthesized Low Annual Flow								
Reach 2	399-715	399-715	400-717	401-717	400-717	510-768	511-769	510-768
Reach 3	497-908	497-908	498-909	498-910	504-918	790-1076	791-1077	801-1087
Reach 5	688-1477	689-1478	690-1479	691-1480	698-1489	--[4]	--[4]	--[4]

Source: David Stiller and Associates, 1983.

[1] Values during May through September irrigation season.

[2] Historical mean discharge is approximately the average flow. Historical low flow is the discharge expected under the worst of circumstances. Synthesized low flow is the discharge expected under typical low-flow conditions. Mean discharge minus one standard deviation is a flow somewhere in between low and mean discharges, included here to illustrate a full range of flow conditions. For a tabulation of flow volumes by month for each of the four flow conditions, see Stiller and Associates (1983).

[3] River reaches are the same as those designated by Woods (1981, figure 1). Water quality values are those predicted for the downstream end of these reaches. Reach 2 ends at Ashland, above the Tongue River's confluence with Otter Creek. Reach 3 includes Otter Creek's influence and ends at Brandenberg. Reach 5 ends at miles City, above the Tongue River's confluence with the Yellowstone River.

[4] Predicted ranges in total dissolved solids (mg/l) are only for May and June and only for reaches 2 and 3. Reach 5 is dewatered in June under this scenario and flow condition.

by mining at the Montco Mine. Such small increases in dissolved solids loads would have no effect on uses of Tongue River water and no impact on irrigation or other agricultural uses.

Cumulative Hydrologic Impacts

Cumulative impacts to the Tongue River hydrologic system due to the Montco Mine, in conjunction with mining upstream in the Tongue River drainage, should be negligible to minor. In addition, the impacts would in all probability take decades to become evident or measurable. Three recent investigative efforts have been made of cumulative, long-term impacts to the Tongue River hydrologic system by present and future intensive surface coal mining in the region. Woods (1981, p. 48) concluded that "even with intensive mining the dissolved solids concentrations in the Tongue River [would] not increase substantially, nor [would] Tongue River water reach dissolved-solids concentrations unfit for irrigation supply."

Van Voast and Thompson (1982) analyzed the cumulative impacts of ten surface coal mines above the Tongue River Dam, approximately 30 miles upstream from the North King unit, and concluded that "dissolved solids in the river (at the dam) would increase by more than 30 mg/l about half the time, and that 10 percent of the time the increases would exceed 50 mg/l (Van Voast and Thompson, 1982, pp. 15-16). Such increases would have no impact on present downstream water uses.

In a comprehensive analysis of cumulative Tongue River water quality impacts attributable to intensive surface coal mining, DSL and the U.S. Office of Surface Mining (DSL and OSM, 1982) analyzed the potential for long-term and cumulative water quality degradation. This analysis uses the previously referenced model prepared by Woods (1981) and cumulative, mining-induced water quality changes in the Tongue River at the Tongue River Dam calculated by Van Voast and Thompson (1982). The DSL/OSM analysis concluded (1982, p. II-15) that various limited acreages of mining along the Tongue River, in conjunction with mining upstream from the Tongue River Dam, would increase dissolved-solids concentrations in the river by minor amounts, but that the suitability of the water for irrigation would be comparable to present conditions; that is, it would have a low to medium salinity hazard. Suitability of Tongue River water for irrigation may decrease downstream in the Miles City, Montana, vicinity; however, it would still be suitable for irrigation of most crops under most conditions (DSL/OSM, 1982, table II-5). It is important to note that the mining acreages assumed under the petition evaluation's limited mining scenario (scenario 4, p. II-12 and table II-5) are substantially greater than those proposed to be mined in Montco's 24-year mine plan. Hence, predicted water quality impacts for the petition evaluation's limited mining scenario are probably greater than those that would actually result from mining by Montco. Further, the petition evaluation concluded that under the limited mining scenario "the increase in TDS levels would be insignificant compared to projected TDS levels with increased irrigation in combination with no mining in the petition area" (1982, p. II-15).

The additional analyses done for the final EIS (Stiller & Associates, 1983 and 1984) include development scenarios representing all anticipated mining in the area, including the possiblity that Montco may eventually mine presently unleased adjacent federal coal (table III-3). These scenarios were constructed after DSL's review of the preliminary draft EIS on the proposed Tongue River Railroad (Interstate Commerce Commission, 1983). A description of these scenarios is contained in a document prepared to support this final EIS (Stiller & Associates, 1983), available for review from DSL.

Predicted results are shown in table III-4 by scenarios D, E, and F, which represent increased levels of mining and flood irrigation in the lower Tongue River Valley, in conjunction with mining above the Tongue River Dam. Scenario D represents substantially more mining than proposed by Montco. Table III-4 indicates that water quality impacts from all anticipated mining would probably be too small to measure accurately using standard laboratory methods. This would be the case even if the present Tongue River Reservoir was removed and the river flowed unimpeded throughout the year (Stiller and Associates, 1984). In short, water quality changes in the Tongue River due to all mining in the Tongue River drainage would have no effect on today's water uses.

Other cumulative hydrologic impacts due to mining development in the region would be even less significant but probably more localized. Such impacts would likely be limited primarily to occasional increased sedimentation in Tongue River and its tributaries due to road and railroad construction and maintenance. Other impacts, such as water well and supply disruptions, would be very localized.

Additional Impacts

Additional impacts that would occur to the surface hydrologic system from mining in the North King unit are less severe and less significant than those discussed above.

McKelvey Spring (Spring 35, fig. II-1) may dry up as a result of mining. As stated in chapter II, Hydrology, it is uncertain whether the spring's major source is the Middle Knobloch-McKelvey clinker area adjacent to the spring, or the Middle Knobloch and McKelvey coal seams discharging through clinker from the east. If it is the former, Montco's overburden stockpile would intercept most recharge and cause the spring to eventually dry up. Following mining and reclamation, recharge capacity might recover sufficiently to restore spring flow, although the time that would be required for this is unknown.

If the spring's source is the coal seams, mining would also cause the spring to dry up. Reestablishment of the postmining ground water flow system may eventually allow the spring to reoccur; however, this is not certain and the time required is unknown. In addition, water quality of the spring discharge may be degraded under these conditions.

Analysis of Montco's mine plan also indicates that extreme flood flows in King Creek may damage a sediment pond. A sediment pond proposed by Montco encroaches upon King Creek's 100-year floodplain. Such a flow event may erode the pond structure and destroy it, causing minor downstream sedimentation.

Montco proposes to construct its railroad loop on a portion of the Tongue River 100-year floodplain. However, flood flows of that magnitude, or from a failure of the present Tongue River Dam, would not disrupt mine loadout activities or cause measurable downstream sedimentation. This is because water levels would not top the railroad loop embankment and flood velocities would not be great enough to erode the embankment. The statistical probability that a 100-year-recurrence-interval flood would occur at least once in the planned 24-year life of the railroad loop is about 21 percent.

One stock pond in section 9 would be removed during mining in the North King unit. However, Montco proposes to reestablish it during reclamation.

Montco's placement of its facilities area and railroad loop on the Tongue River alluvial valley floor would have no measurable impact on the Tongue River hydrologic system. Some agricultural fields would be removed from production, and surface recharge to the alluvial aquifer over the facilities and railroad loop areas would be decreased. However, the sheer size of the Tongue River alluvial system makes these impacts insignificant.

Ground Water

Impacts to ground water due to mining in the North King unit would be minor. During mining, the pit would intercept ground water flow. Water levels in the coal seams, overburden, and interburden would thus drop around the mine. Ground water would flow into the pit from the coal seams at about 25 to 30 gpm, not enough to hamper mining operations.

One unknown that could affect ground water impacts is the significance of sandstone units over the coal seams. Available data suggest that the sandstones could include a significant ground-water-bearing unit. If so, initial inflows from the sandstones could add 300 to 600 gpm to the pit. This could overtax sedimentation ponds, occasionally causing pond discharges to fail to meet water quality standards. If the sandstone units are dry, nearly dry, or poorly transmissive, however, pit inflows probably would not stress the pit-dewatering facilities.

At least four wells (numbers 30, 33, 57, and 84 on fig. II-1 and II-2) would be removed by mining and construction of mine facilities and the railroad loop. Dropping ground water levels would affect additional wells in the area. The wells most affected would be one (owned by B.M. Haley) that lies north of spring 3 and another (owned by the U.S. Forest Service) that lies 2 miles east of the North King unit in the northwest corner of section 12. (Neither of these are shown on fig. II-1 or II-2.) Remaining wells in the North King vicinity are either abandoned or are completed in hydrogeologic units which would not be impacted by mining.

Montco initially proposed to withdraw up to 371,000 gallons per day (an average of about 260 gallons per minute) of ground water from the Hell Creek aquifer. DSL responded that such withdrawals may stress the aquifer and fail to minimize disturbances to the prevailing hydrologic balance, which is a regulatory requirement. More recently, Montco informed the Department that it will apply to Montana Department of Natural Resources and Conservation for a water use permit on the Tongue River. Alternatively, Montco may purchase up to 400 acre-feet of water per year from the Tongue River Reservoir. In either case, the proposed amount is negligible compared to the Tongue River's total flow, and impacts would not be measurable. Montco proposes to pump potable ground water from the Fox Hills/Lower Hell Creek aquifer. The proposed pumping rates of less than 20 to about 60 gpm would not affect other water users of the aquifer.

Following mining and backfilling of the pit, the local ground water system would reestablish itself and saturate the spoil. Ground water flow would reestablish itself toward the northwest and the Tongue River. Although current technology is not sufficiently advanced to make accurate predictions of postmining ground water quality in the saturated spoil, it would probably have increased dissolved solids concentrations. Because the reestablished ground water gradient would be toward the Tongue River, postmining spoil water would eventually reach the Tongue River Valley northwest of the North King unit. (See Chapter III, Hydrology, Surface Water.)

Two techniques provide estimates of postmining spoil ground water quality at Montco's North King mining unit. Systems Technology (1982; see also appendix 7) analyzed overburden extract data for DSL using an approach developed by Van Voast et al. (1978), as well as an additional technique developed by Systems Technology.

The Van Voast technique (1978) provides a 95 percent confidence limit about the three major cation concentrations found in shallow ground waters of southeastern Montana. A very rough approximation of the range of dissolved solids concentration of these spoil ground waters is 2,700 to 11,000 mg/l. This is calculated by assuming that the three major cations (calcium, magnesium, and sodium) represent all or most of the cation species present, which is a realistic assumption, and by also assuming that bicarbonate would comprise the total anion concentration, which is also a reasonable assumption for this purpose.

Utilizing another approach, Systems Technology predicted North King unit spoil ground water would have a specific electrical conductivity of about 4,500 umhos/cm (1982, table 9; see also appendix 7). Such a conductivity value approximates a dissolved solids concentration of 3,000 mg/l, which is within the range reported above for the Van Voast technique.

These predicted water quality parameters for spoil ground water in the North King unit are generally within the premining range for coal and interburden ground water units in Montco's mine plan area (table II-9). The higher predicted values for spoil ground water are greater than the higher values currently found in the area. Observations made in mined areas where spoil water quality measurements have been made indicate that ground water within spoil is generally of poorer quality than premining ground water in the area (Van Voast et al., 1978). Changes in postmining ground water quality in the North King mining unit would not adversely affect land or water uses.

It should be noted that the spoil water dissolved solids concentrations predicted above are generally less than the assumed value of 10,000 mg/l used in calculating potential increases in dissolved solids concentrations in the Tongue River (appendix 5). Predictions of water quality degradation in the Tongue River due to mining by Montco (see Surface Water) may be overstated.

Predictions of spoil water quality for the remainder of Montco's mine plan area should also be considered only approximations, like those noted above for the North King unit. In general, both the Van Voast technique and methods developed by Systems Technology (1982) suggest that spoil water quality would be markedly worse in the vicinity of O'Dell Creek (fig. II-2) than elsewhere in Montco's mine plan area. However, greater accuracy and more definite predictions cannot be attained at this time due to lack of more specific hydrologic data and mining plans.

Alternative ground water sources are available throughout Montco's mine plan area, and Montana law requires a coal company to replace water supplies destroyed by mining. No additional on-site impacts of significance are expected beyond those of water quality in backfilled spoil. See Surface Water for a discussion of related off-site impacts.

Mitigating Measures

Sediment Control

Montco has committed to constructing four temporary pits (depressions) to control sediment runoff in the mine pit area prior to when the mine pit would assume sediment control. These pits should be designed for the 10-year, 24-hour storm event to minimize discharges from the permit area and to comply with department rules.

Selective Placement of Overburden

To minimize the changes in the quality of ground water passing through mine spoil, Montco could selectively place overburden to protect ground water quality within the reestablished ground water zone (Dollhopf et al., 1981, p. 57). This would be unnecessary in the North King mining unit because the amount of ground water passing through the spoil would be small, and the alluvial ground-water system of the Tongue River is large. The changes in water quality for the river would thus be unmeasurable.

Nonetheless, reclamation of other lands in the 24-year mine plan area or in other mines whose ground waters would drain into the Tongue River may have to be designed using selective overburden placement. Currently, the areas where selective placement may be necessary are impossible to delineate. Detailed mine plans, overburden chemistry, and ground water characterization studies are necessary for this purpose.

SOILS

[Note: Most of this section has been rewritten.]

> Summary of Impacts: Montco would salvage enough good quality soil for successful overall plant growth after reclamation. But prolonged storage, especially in the facilities area, would biologically degrade the soil, and

this could lead to lower postmining vegetative vigor and diversity for several years following initial planting.

Unavoidable soil impacts would include loss of the natural soil profile, soil structure, pore space, pore continuity, and a reduction in organic matter concentration. As a result, the land would probably be more sensitive to mismanagement and drought for perhaps several decades after mining. Long-term impacts (more than several decades) are uncertain, owing to inadequate information on the practices required for long-term success.

North King Mining Unit

Soil Cover, Depth, and Quality

About 975 acre-feet of salvageable soil lie in the parts of the facilities area and North King mining unit that would be disturbed (table III-5). Montco would take about 693 acre-feet of soil from the North King mining unit, yielding an average depth of about 17 inches of soil for reclamation of the unit. (As used in this text, "soil" will include both topsoil and subsoil.)

Originally, (see draft EIS), Montco proposed to salvage some unfavorable soils along with the favorable soils. In addition, the company based its proposed salvage depths mostly on the few soil samples taken in and around the North King mining unit and facilities area, an approach which does not adequately reflect the variability within each soil series.

In its revised plan, Montco would salvage only favorable soils. The depths of these soils are now based on all chemical and physical data from the entire intensive soil study area. (See chapter II.) Therefore, the estimated soil salvage volumes (table III-5) most likely reflect only the most favorable soil.

To carry out the salvage operation, which may actually yield more soil than estimated, Montco would sample soil before stripping it. Samples would be analyzed for texture, pH, electrical conductivity (salinity), and exchangeable sodium percentage (an indicator of sodium hazard). Sampling would maximize soil recovery because a soil specialist would measure precisely and then stake the salvage depths of individual favorable soils.

The sampling rate would probably be sufficient to assure that only favorable soils would be taken. Sampling sites would lie on 300- to 500-foot centers. Where lab tests show soil patterns to be complex and chemical and physical characteristics variable, a second sampling pass may be made on 200- to 300-foot centers. This sampling program would result in a maximum of one sample for every 5.7 acres and a minimum of one sample for every 0.9 acre.

Research suggests that the 17 inches of cover soil would be adequate for revegetation. In a study conducted at mines in Wyoming, Montana, and North

Soil Resources of the Proposed Disturbance Area

Mapping Unit[1]	Acres to Be Disturbed	% of Total Area to Be Disturbed	Proposed Salvage Volumes (acre-feet) Primary Lift (Topsoil)	Secondary Lift (Subsoil)	Tree-Lift Soils	Total Soils	% of Total Salvage Volume
Havre L	3.27	0.49	1.3	11.8	0.0	13.1	1.34
Harlem CL	7.28	1.08	2.9	26.2	0.0	29.1	2.99
Glendive SL	0.24	0.04	0.1	0.7	0.0	0.8	0.08
Busby SL, finely stratified	1.64	0.24	1.6	6.6	0.0	8.2	0.84
Vanda Variant C	4.37	0.65	0.0	2.2	0.0	2.2	0.23
Busby SL	17.76	2.65	17.7	35.5	0.0	53.2	5.46
Kirby GRSL	21.82	3.25	0.0	10.9	20.1	31.0	3.18
Birney SL	11.14	1.66	8.9	0.0	0.0	8.9	0.91
Pinelli Variant L	5.86	0.87	2.9	8.8	0.0	11.7	1.20
Yamac SL	17.32	2.58	8.6	60.7	0.0	69.3	7.11
Yamac CL, sheetwashed	60.22	8.97	30.1	228.8	0.0	258.9	26.57
Kobar CL, saline-alkaline	57.86	8.62	43.4	0.0	0.0	43.4	4.45
Dollard L	35.23	5.25	17.6	0.0	0.0	17.6	1.81
Grobutte-Patent Complex	13.60	2.03	6.8	0.0	0.0	6.8	0.70
Yamac-Havre L, eroded	32.09	4.78	16.1	128.4	0.0	144.5	14.83
Dollard-Blazon Complex	54.23	8.08	27.1	43.4	0.0	70.5	7.24
Benz CL	0.26	0.04	0.1	0.2	0.0	0.3	0.03
Tisworth L	3.28	0.49	1.6	0.0	0.0	1.6	0.16
Glendive-Glendive Variant Complex	3.91	0.58	3.9	22.5	0.0	26.4	2.71
Cooers-Rentsac Variant L	21.75	3.24	10.8	69.6	21.8	102.2	10.49
Kirby Variant-Rentsac Variant Complex	149.38	22.26	0.0	0.0	74.7	74.7	7.67
Clinker Rock Outcrop - Talus Association	7.34	1.09	0.0	0.0	0.0	0.0	0.00
Sandstone Rock Outcrop	3.36	0.50	0.0	0.0	0.0	0.0	0.00
Disturbed Land	6.95	1.04	0.0	0.0	0.0	0.0	0.00
Dollard Variant-Blackhall Complex	86.50	12.90	0.0	0.0	0.0	0.0	0.00
Water	1.15	0.17	0.0	0.0	0.0	0.0	0.00
Topsoil Stockpiles	43.28	6.45	0.0	0.0	0.0	0.0	0.00
TOTALS	671.09	100.00	201.5	656.3	116.6	974.4[2]	100.00

Source: Montco, 1983, vol. 3, chap IV.

Note: Table does not include soils that would not be disturbed by mining or associated activities.

[1] Abbreviations: C=clay CL=clay loam L=loam SL=sandy loam GR=gravelly

[2] Of the 974 acre-feet salvaged from the permit area, 281 acre-feet would come from the facilities area and transportation corridors; 693 acre-feet would come from the mining area.

Dakota, Barth and Martin (1982) investigated how much soil is optimum over different kinds of spoil (overburden). Spoil was grouped for the study into four different types based on chemical and physical traits. Montco's favorable North King overburden most closely resembles the Type I spoil identified by Barth and Martin. It should be noted, however, that spoil textures for all types studied by Barth and Martin were finer than what is expected at the North King site. For the Type I spoil, the researchers found that the soil depth considered optimum for the production of certain perennial grasses was about 20 inches, although annual variation and individual species requirements suggested the depth can range from about 16 to 34 inches.

Although it appears that 17 inches of soil cover depth for the North King unit would generally be adequate, in some instances it may not:

- None of the spoil studied by Barth and Martin (1982) included burn materials, about half the proposed rootzone materials. Therefore Barth and Martin's Type I spoil cannot be compared exactly with Montco overburden, and the soil-depth research cannot show conclusively that 17 inches of soil is enough at the Montco Mine.

- Although the burn material samples taken from the one hole and analyzed for saturation percentages showed that the material has adequate water-holding capacity, some uncertainty remains as to whether all burn materials are similar (See Geology, Overburden.) If some burn material is droughty and is placed in the rootzone, decreased plant vigor and density in some areas, especially during dry years, could result. (Over the long-term, droughty burn material located sporadically within the mining unit could also result in increased plant diversity, a favorable effect.)

- A small chance remains that pockets of unfavorable overburden could end up in the rootzone. (See Geology, Overburden.) If this happens, vegetation may be less productive in some isolated areas.

Facilities Area and Transportation Corridors

Soil Cover, Depth and Quality

Montco would salvage about 281 acre-feet of favorable soil from the proposed facilities area and transportation corridors, providing an overall average cover depth of about 20 inches. Overburden would not be removed. Soil presalvage sampling, salvage, and replacement would take place in the same way as in the North King unit. Since overburden would not be disturbed, 20 inches of soil would probably be more than adequate to assure successful reclamation.

Prime Farmland Soils

Montco would salvage and store separately the approximately 8 acres of potential prime farmland soils that would be affected by railroad loop construction. The company would handle this material as required by law (ARM 26.4.811 through 26.4.814).

Soil Stockpiling

Reclamation would initially be most successful with direct-hauled soil (freshly stripped material taken directly to reclamation areas). Immediately spread over regraded spoil or other disturbed areas, freshly stripped soil contains a number of favorable components. One is the seed of native plants (Iverson and Wali, 1982; Howard and Samuel, 1979; Beauchamp et al., 1975). Another is rhizomes (underground stems) and other plant parts that grow after transport (Howard and Samuel, 1979). A third is soil microorganisms, such as bacteria, fungi, and algae, essential to many soil and plant processes, including nutrient cycling and uptake, decomposition, and water uptake.

Prolonged soil storage causes a reduction or loss of these favorable components. Although Montco would avoid stockpiling whenever possible, most soil would be stockpiled until year 6 of mining, when both direct-haul and removal of soil from stockpiles would begin (David Haddock, Intrasearch, Inc., oral commun., January 26, 1984). Facility area soils, including prime farmland soils, would be stockpiled for 24 years, the life of the mine. (See chapter I.) It has been recommended that soil not be stockpiled longer than 4 to 5 years (Singleton and Williams, 1979).

Researchers generally agree that the major changes in disturbed and stockpiled soils are shifts in dominant soil fungi and the reduction or loss of other microorganisms, such as mycorrhizal fungi (Fresquez and Lindemann, 1982; Liberta, 1981; Rives et al., 1980; Reeves et al., 1979; Lawrey, 1977; Miller and Cameron, 1976; Davidson, 1976). Especially important to plant growth, mycorrhizal structures develop when certain fungi and plant roots form a symbiotic (mutually beneficial) relationship. The fungi absorb nutrients and water for the plants; the plants provide carbohydrates from photosynthesis for the fungi. The mycorrhizae thereby serve as highly efficient extensions of plant roots.

Mycorrhizae are important in maximizing range productivity, since most plants depend on these structures. Some plants cannot succeed without their fungal associate (Trappe, 1981). Mycorrhizae are particularly important to plants' phosphorus nutrition and water uptake (Christensen and Allen, 1980). Thus, mycorrhizal associations in southeastern Montana are especially critical because of the semiarid climate and naturally low plant-available phosphorus in soils and overburden (Power et al., 1978; Muir, 1971).

As the severity of the disturbance increases (e.g. prolonged storage), so does the potential for elimination of these fungi. Therefore, the time required for reestablishment of vegetation dependent on mycorrhizal associations also increases (Reeves et al., 1979). The loss of the fungi that form mycorrhizal associations could lower plant species diversity and productivity for an unknown period of time.

The potential loss of a native plant source (either by seed or rhizomes) and soil microorganisms would probably be moderate to severe in the 6-year-old stockpiled soils and very severe in the soils stored for 24 years. These losses would primarily occur in the topsoil (first lift) stockpiles (as opposed to the subsoil stockpiles).

Eventually, mycorrhizal fungi and other important microorganisms would reinvade the soil on reclaimed areas; however, the time necessary would depend on several factors and cannot be accurately predicted based on current research. Lawrey (1977) estimates, based on research in Ohio, that coal strip-mining impacts are evident in soil microfloral diversity and activity, and may influence decomposition potential, cycling of trace elements, and soil development long after vegetation establishment. At present, no feasible method of artificially inoculating large fields with mycorrhizal fungi or other important organisms exists. Therefore, ways to mitigate this potential problem are limited. (See Mitigating Measures.)

Retention of viable soil microorganisms, seeds, and rhizomes would occur to a limited extent in the surfaces of long-term topsoil stockpiles, since these piles would be seeded for stabilization (discussed later). However, the surface-area of these stockpiles would be very small compared to the total volume of stored topsoil. Therefore, the concentration of favorable components in stockpiled soil would be insignificant compared to concentrations in freshly stripped topsoil. (See Mitigating Measures.)

Soil Erosion

The proposed postmining topography would consist largely of gentle (0 to 10 percent) slopes. Short, steeper slopes would lie throughout the disturbance area, proposed for the sides of reconstructed drainages and for the edges of the mine area where steeper slopes are necessary to match the surrounding undisturbed topography.

Generally, soil erodibility tends to increase with greater silt content and decrease with greater sand and clay content (U.S.D.A. Soil Conservation Service and U.S. Environmental Protection Agency, 1977). However, fine-sand-sized materials are also easily eroded (Schafer et al., 1979). Therefore, soil erosion potential is greatest where silt and/or fine to very fine sands are a significant portion of the soil material. Coarser sands allow for greater infiltration and less runoff of water, and are therefore much less erosive than the fine sands. Medium- to heavy-textured soils--with moderate to high amounts of clay--generally resist erosion even though water runoff is usually high. This resistance is due to the greater cohesion between clay particles.

Most soils proposed for disturbance are medium- to heavy-textured, or have many coarse fragments (which also reduce erosion hazard). About 14 percent (by volume) of the soils proposed are sandy-textured. The very-fine-sand content of these soils averages about 10 percent. The fine-sand content is unknown. Based on the relatively low volume of these sandy-textured soils in the proposed disturbance area and the low percentages of very fine sands, no serious erosion is expected. The dilution of sandy-textured soils with heavier-textured soils during handling would further reduce erosion hazard.

Some erosion occurs in any reclamation area, mostly in the first couple of years until vegetation becomes well established. This is especially true during a major rainstorm or rapid snowmelt. This erosion is due primarily to the unavoidable impacts on soils. It also stems from the occasional ineffectiveness of initial erosion control, although Montco would use standard erosion-control measures. In any case, no major revegetation problems are expected as a result of the initial erosion.

Steep Slope Reclamation Areas

Montana rules (ARM 26.4.501(2)) requires that no postmining slopes exceed 20 percent, unless approved by DSL. Montco, however, proposes to restore (approximately) the original topography. Thus, the company would rebuild any slopes that now exceed 20 percent, including about 25 acres of the disturbance area: 17 acres of slopes between 20 and 33 percent and 8 acres of slopes 33 percent or greater.

Montco would reclaim with conventional techniques all slopes less than 33 percent, where equipment for grading, replacing soil, preparing seedbeds, and distributing soil amendments, seed, and mulch can operate. Slopes 33 percent or greater, or "steep" slopes, would be reclaimed using special revegetation and stabilization techniques.

Nine steep slopes (grades of 33 percent or greater) lie in the disturbance area. Two would be unmined, three would be fill slopes; and four, associated with sediment ponds, would be minimally, if at all, disturbed. All nine are covered by the Kirby Variant-Rentsac Variant very gravelly loams soils complex. Underneath the soil is scoria bedrock.

After reclamation, scoria materials would remain the primary growth medium for steep slope areas. Soil cover would vary. If the volume of soil materials (less than 2 mm) in the scoria exceeds 50 percent, the amount of soil would be considered sufficient. If not, tree-lift soils (discussed later) would be added.

Scoria is well suited for steep slopes. Though containing fine-earth materials, scoria also consists of gravels and angular cobbles, which would greatly increase water permeability. In effect, the scoria would serve as a highly permeable gravel mulch, limiting soil particle movement downslope. Stone and gravel mulches control erosion more effectively than 4,000 pounds per acre of straw mulch (Meyer et al., 1972). The scoria's coarseness would also retard wind erosion.

Soil Stockpile Stabilization

Measures to control erosion of soil stockpiles would depend on how long the stockpile would exist. To the extent possible, Montco would avoid stockpiling of soils for less than 90 days.

Stockpiles to last longer than 90 days but less than one year would be (1) disced and/or harrowed to prepare the seedbed and (2) drill seeded, except for the steeper side slopes, which would be broadcast seeded during the first appropriate growing season. The seed mixture used would be a temporary cover crop, such as Horsford barley, Otis barley, Cayuse oats, or wintergraze. If compacted, the surface of the stockpile would be ripped to a depth of 24 inches prior to discing. Stockpiles not lasting over one growing season would be covered with anchored mulch. Stockpiles lasting more than one year but only through one growing season would also be seeded with a temporary cover crop.

Stockpiles to last for two or more growing seasons would be seeded to a permanent grass mixture and mulched. Seedbed preparation would take place as above, except that 40 pounds per acre of phosphorus fertilizer would be evenly broadcast over the soil prior to discing or harrowing. The stockpiles would then be seeded with 8 pounds slender wheatgrass, 8 pounds streambank wheatgrass, 8 pounds thickspike wheatgrass, and 2 pounds of cicer milkvetch per acre. The stockpile surface would be straw mulched at 2 tons per acre and anchored. When stockpile outslopes are too steep for efficient drill seeding and crimped straw mulching, the slopes would be broadcast seeded, followed by the application of straw mulch and plastic netting.

Where plastic netting is used, it must be anchored in enough places to prevent wind-whipping. If anchored improperly, with insufficient soil contact, water runs beneath the netting, causing erosion (Kay, 1980) including gullying (Cook et al., 1970).

Tree-Lift Soils

About 117 acre-feet of tree-lift soils lie in the disturbance area (table III-5). Tree-lift soils are those that contain a relatively high percentage of coarse fragments or that support a ponderosa pine/juniper community. These soils would be used for the ponderosa pine/juniper and sidehill bunchgrass revegetation communities.

Ongoing studies at Colstrip have so far suggested that some rock fragments in the soil, especially near the surface, aid in water retention and tree growth, provided the rock fragments are not calcareous (Stark, 1982). The sidehill bunchgrass community is now found on rocky soils, although the surface horizons are less rocky and contain more fines than ponderosa pine/juniper soils.

The percentage of fines in the tree-lift soils and spoil reflect the materials' expected variability. Where fines (less than 2 mm) are deficient, moisture-holding capacity would be improved by adding fines to the soil. Montco has set up guidelines describing when fines should be added, based on the quality of the tree-lift soils and the planned revegetation community. (See Montco, 1983, vol. 3, chap. IV, p. IV-2-1c.)

Soils Not Salvaged

One soil mapping unit in the disturbance area, the Dollard Variant-Blackhall Complex, would not be salvaged (table III-5). Very steep slopes, high clay content, shallowness to bedrock, and saline-alkaline characteristics make salvage inappropriate. The lands covered by the soil complex, about 13 percent of the disturbance area, would be reclaimed with other salvaged soils.

County Road Relocation and Railroad Transportation Corridor

Montco would temporarily relocate part of the county road. About 3 acres of officially classified prime farmland soils (if irrigated) would be disturbed. Montco intends to handle these soils as required for prime farmland (ARM 26.4.811 through 26.4.814).

The Tongue River Railroad mainline, next to Montco's rail loop, may ultimately be extended south of the currently proposed terminus. When or if the extension would occur is not known. Therefore, for reclamation of the railroad transportation corridor, Montco has proposed two plans, discussed in chapter I.

For the second plan, Montco would convert part of the railroad corridor to a road suitable for county use after mining ends. The segment of the county road previously relocated to the west would be relocated again to the transportation corridor, and the disturbed area on the flood plain could then be reclaimed.

Mitigating Measures

Montco could mitigate the loss of mycorrhizal fungi and other important soil microorganisms by spreading out the topsoil (A and upper B horizons) stockpiles. Only in the upper few feet of any stockpile can mycorrhizal fungi function, since they require oxygen and a host plant. More surface area would support more plants and microorganisms. More organisms would then be available to infect other plants during reclamation.

Montco is proposing to stabilize the steepest soil-stockpile slopes with plastic netting. Netting is sometimes ineffective because running water can still erode the soil underneath. To reduce this problem, more anchoring could be used to tighten the contact between the soil and netting.

VEGETATION

Summary of Impacts: Based on Montco's reclamation plan, revegetation failure is unlikely. Even so, biological impacts from prolonged soil storage, especially in the proposed facilities area, could lower plant species diversity and productivity for several years following initial planting. Moreover, a small chance exists that some unfavorable overburden could be placed in the rootzone, resulting in small, isolated areas of stunted plants or sparse vegetation. The study area plant species list includes two species that have rare varietal forms. Montco did not identify the varieties of these species; therefore, it is unknown if the rare varieties exist in the study area.

North King Mining Unit

Revegetation

All vegetation would be removed from active mining areas during mine development. For reclamation, Montco has proposed five vegetation areas: (1) ponderosa pine/juniper, (2) big sagebrush/grassland, (3) sidehill bunchgrass, (4) sod-forming grassland, and (5) drainageways. The species included in each area are given in appendix 1. These species were selected on the basis of premining vegetation, soil, and wildlife inventories, commercial seed availability, and a literature review of appropriate reclamation publications.

Montco would have difficulty reestablishing two vegetation types: ponderosa pine/juniper and big sagebrush/grassland. After the first year of reclamation, total tree density in the ponderosa pine/juniper type would probably be lower than the planned density of roughly 662 trees/acre (the premining density estimate; see appendix 10). This reduction would be due to establishment of fewer numbers of junipers. Continued planting, as proposed by Montco, would be required for successful reestablishment of the ponderosa pine/ juniper type. Big sagebrush density in reclaimed big sagebrush/ grassland, in contrast, may be much higher than premining. (See appendix 10.) After the first 96 acres of big sagebrush/grassland are reclaimed, Montco would reevaluate the seeding rate. Lowered rates could be used as reclamation continues. (See Mitigating Measures.)

Seed for some species identified as dominant in the premining vegetation inventory is not commercially available or is only available in limited quantities. Therefore, seed from other available species was selected in their place, based on adaptability to expected soil and climatic conditions. Additional species were also added to some seed mixtures, based on importance to wildlife as cover and food. Appendix 1 lists each species variety and its primary locations on the site, soil adaptation, tolerance to salinity and alkalinity, wildlife value, palatability to cattle, method of establishment, and proposed postmining area of establishment.

Prolonged soil storage could cause lower plant species diversity and productivity for an unknown period of time due to the biological impacts on the soils. (See Soils.)

Soil and Overburden Relationships

Based on Montco's soil salvage plans, only the most favorable soils would be salvaged. (See Soils.) Because average favorable soil depth is limited to about 17 inches in the North King mining unit, vegetation success demands rootzone overburden (spoil) of good quality. Montco's overburden handling plans and postmining testing program would most likely assure that most rootzone overburden is of adequate quality.

A small chance of error does, however, exist in the overburden handling and testing programs. (See Geology, Overburden, and Soils.) An error could lead to low vegetative productivity and density in small, localized areas within the reclaimed mining area. Depending on their size and number, Montco could be required to rework these areas (e.g., replace overburden with more favorable material, replace soil, and revegetate). Based on both the soil and overburden handling and testing plans, revegetation failure is highly unlikely.

Varying Soil Depths and Textures

Montco would vary the depth of redistributed soil materials in different reclamation communities. The purpose of this is to promote the desired "edge effect." (An edge is a transition zone between two or more distinct plant communities.) Edges are important to wildlife. (See Wildlife.)

Specifically, soil depth and texture would be varied for the ponderosa pine/juniper, sidehill bunchgrass, and drainageways communities. Edge effects (sometimes termed "ecotones") can be either abrupt or gradual (Daubenmire, 1968, p. 18-19). In gradual edges, a distinct community with characteristics additional to those of the adjoining communities can often be found. Therefore, some plant species in the transition zone would probably not be found in either adjoining community (Odum, 1971, p. 157-158). This transition effect, if it occurs, as well as the varying of soil depths and texture, would most likely increase overall plant diversity.

Erosion Effects

Most soils proposed for salvage are medium to heavy textured or have many coarse fragments. Therefore, overall erosion hazard is considered low to moderate. Fine sands and silts (erosive materials) are not dominant in the soils proposed for salvage. (See Soils.) Although not expected to be serious, some erosion always occurs in any reclamation area, especially until adequate revegetation is established.

To minimize erosion, the company is proposing to use annual cover crops, anchored straw mulch, and scoria or gravelly/cobbly tree-lift materials (on the steeper slopes) to stabilize the reclamation areas until a permanent vegetative cover is achieved. Although such measures would reduce sheet and rill erosion on slopes and in drainages, they would not entirely prevent it, nor would they prevent gully erosion. If a heavy rainstorm or rapid snowmelt were to occur before cover vegetation was well established, significant areas of vegetation could be destroyed, and significant soil loss could occur. If this happened, routine mine inspections by DSL would reveal the problem, which Montco would be required to correct.

Premining and Postmining Habitat Comparisons of Proposed Disturbance Areas

Table III-6 compares premining and postmining acreages of vegetation and wildlife habitat types. The big sagebrush/grassland type area would increase by about 64 acres, the steep slopes area decrease by 64 acres. The remaining types would remain roughly the same size, with minor changes due to the proposed postmining topography, drainage system, and homestead removal.

TABLE III-6

Proposed Permit Area Postmining Vegetation Type/Wildlife Habitat Type Correlation and Disturbed/Reclaimed Acreage Comparison

Postmining Vegetation Type	Wildlife Habitat Types		Disturbed Acreage	Reclaimed Acreage
Ponderosa Pine/Juniper	Ponderosa Pine/Juniper		115	115
Big sagebrush/Grassland	Big sagebrush/Grassland		238	302
Sidehill bunchgrass Sod-forming grassland	Bunchgrass Sod-forming grass		173	167
Drainageways	Silver sagebrush/Grassland Sod-forming grass		20	25
Steep slopes	Breaks		72	8
Alfalfa	—		10	10
Homestead	—		0	0
Water	—		2	3
		TOTAL*	630	630

Source: Montco, 1983, vol. 3, chap. IV, and vol. 6, chap. V.
Note: Table includes the North King mining unit and facilities area.
*Includes 502 acres of mining-level disturbance, and 169 acres of facilities-area disturbance. Does not include disturbance from railroad transportation corridor.

Range Condition and Stocking Rates

The premining potential recommended stocking rate would average 241 cow-calf units for a one-month grazing period, or 27 cow-calf units for a nine-month grazing period. For several decades after mining, grazing potential of the reclaimed land would probably not be as high as the premining potential under optimum management. This slight reduction in optimum grazing potential would occur because of loss of soil structure, organic matter, pore continuity, and other unavoidable mining impacts on soils. If managed properly, however, the condition of the reclaimed land would be better than its current (low-good) condition.

Irrigation

Annual precipitation at the Montco Mine plan area is low, ranging from 6 to 20 inches and averaging about 13 inches over the last 24 years. (See Chapter II, Climate.) Evapotranspiration rates are high, and this, combined with a dry year or season, often decreases soil moisture to a low level. Woody species are most affected by this, in part because tree roots are cut and sometimes damaged during transplanting.

To enhance reclamation success of woody species, Montco proposes to water tree transplants during periods of moisture stress for about two years. Stress would be monitored weekly, spring through fall, to determine when moisture is inadequate. Unsurfaced paths, passing adjacent to each grove of transplants, would provide access for watering. The paths would probably be reclaimed following the end of irrigation, using species from revegetation communities 1 through 4 (appendix 1); however, some paths may be proposed to be left as permanent rancher access trails.

Manure Application

For the "drainageways" community, Montco is proposing to use manure, if available, to add nutrients to the soil and increase infiltration and water-holding capacity. Manure contains seeds of both weeds and desirable native species. Composting the manure could alleviate weed problems by destroying most of the seeds; however, desirable seeds would also be destroyed. The manure would probably contain native seed not yet commercially available, and could increase species diversity. The initial weed infestation would probably be short term (one to two growing seasons), and could actually be beneficial by helping control erosion during early revegetation. If weeds become a problem, management alternatives are available to control or eliminate the weeds.

Other Disturbed Areas

Facilities Sites

All vegetation would be removed from the facility site construction areas during mine development. Following abandonment, all structures, concrete footings, and the like would be removed. The area would then be graded to the approximate original contour. Areas stripped of vegetation and compacted from construction or travel would be ripped to a depth of 2 feet or disced, and soil respread. The area would then be seeded and mulched. Fertilizer would be added at appropriate times at rates dictated by soil analysis.

Enough favorable soils exist for facilities area reclamation. However, biological impacts due to prolonged soil storage could lower plant-species diversity and productivity for an unknown period of time. (See Soils.)

Roadbeds

Following road abandonment, all roadbed surfacing materials and culverts would be removed and the area graded to about the original contour. The area would be ripped to a depth of 2 feet, soil would be respread; a seedbed would be prepared; and the area would be seeded. Straw mulch anchored into the seedbed at a rate of two tons per acre would be used to control erosion. The area would be seeded, depending on its location, with species listed for postmining areas 1 through 4 (appendix 1). Fertilizer would be added at appropriate times at a rate dictated by soil analysis.

Overburden and Soil Stockpile Sites

Following stockpile removal, overburden stockpile sites would be reclaimed in the same way as roadbeds, except that a cover crop, drill seeded along the contour, would replace the straw mulch as an erosion control measure.

Soil stockpile sites would be reclaimed in the same manner as overburden sites, except that soil replacement would be unnecessary, since soil would not be salvaged prior to stockpiling.

Temporary Sediment Ponds and Diversion Ditches

Temporary sediment ponds would be removed after mining when (1) the upstream drainage area has been stabilized, (2) revegetation standards have been met, and (3) acceptable water quality has been attained. To begin reclamation, each pond would be dewatered and bottom sediments would be analyzed for toxic properties. If the sediment were non-toxic, the entire pond would be graded to about the original contour. The area would then be covered with soil. If the sediment were toxic, it would be removed and buried under 8 feet of non-toxic material before grading and topsoiling. Revegetation would take place in the same way as for roadbeds, except without ripping.

Prime Farmland Reclamation

Following abandonment of the railroad loop, all fill materials would be removed. The surface would then be ripped to a depth of 2 feet to eliminate compaction and graded level for spreading of soil. Soil would be laid (1) in the thickest possible lifts to decrease compaction; (2) to achieve a uniform thickness; (3) to minimize erosion and contamination; and (4) to minimize deterioration of the biological, chemical, and physical properties of the soil. Each lift replaced would be tested for excessive compaction.

Revegetation would follow techniques similar to those discussed earlier, except that different species would be planted: Montco is proposing to return this land to hay meadow rather than to native rangeland. This would allow postmining land use to be the same as premining land use and would be compatible with adjacent lands. Native range grasses would not attain desired results, as they are generally less productive than the alfalfa-grass hay mixture and are adapted to drier conditions.

The currently irrigated hay meadow in Section 18 that would be disturbed by the loop would be irrigated again after the railroad is removed. The hay meadow in Section 7 is currently not irrigated. Whether to irrigate after removal of the railroad would be decided by Montco, the landowner, and DSL.

Prior to reclamation of the irrigated hay meadow, the landowner would be contacted to determine planting specifics. Initially, Montco proposes to seed Regar brome grass, orchardgrass, and Thor alfalfa. The target production rate would be 3 to 4 tons of hay per acre where irrigated and 1 to 1.5 tons per acre where unirrigated. To determine success, comparison test plots would be established on adjacent areas. The average annual crop production on reclaimed prime farmland areas would be determined based on a minimum of 5 years of data. This level of crop production would be compared to the test plots, and if the production levels were equivalent or higher, revegetation would be considered successful (ARM 26.4.815).

Rare Species

Hymenopappus filifolius and Eriogonum pauciflorum, listed by Montco as species occurring in the study area, have varietal forms that are identified by the Montana Rare Plant Project (Lesica et al., 1984) as having either a peripheral or regional endemic distribution in Montana. Montco did not identify what varieties of the above species were encountered during the vegetation baseline survey; therefore, it cannot be determined whether these plants represent the listed rare varietal forms. It is also unknown where these plants were found within the 25,000-acre study area. Therefore, it cannot be determined if these plants would be disturbed by mining activities. (See Mitigating Measures.)

Mitigating Measures

If Montco's proposed high seeding rate of big sagebrush results in an undesirable overabundance of sage in the reclamation areas, the company could reduce sage densities by burning, chaining, or other shrub-control methods.

To resolve any questions regarding the status, location, and extent of Hymenopappus filifolius and Eriognum pauciflorum, Montco could complete the following: 1) a field reconnaissance of the proposed permit area and surrounding adjacent lands; 2) a brief demographic analysis based on the field reconnaissance; and 3) collect reference specimens and submit them to plant taxonomists for verification of species and varietal identification.

AQUATIC ECOLOGY

Summary: The limited aquatic habitat within the North King mining unit would be removed with no detrimental effects. No significant degradation of water quality or aquatic populations in the Tongue River is anticipated.

A minor amount of aquatic habitat (McKelvey spring, stock tanks, and ephemeral streams) would be removed during mining. The loss of the few associated insects and algae would be insignificant. Since these organisms also inhabit the region outside the mine plan area, the reconstructed drainages might be colonized after reclamation.

Mining would have a negligible impact on the water quality of the Tongue River. (See Hydrology.) Therefore, the plants and animals inhabiting the Tongue River would not be affected.

Fisheries in and near the Tongue River may be adversely affected by an increase in fishing. Recreational activities on the Tongue would increase and as a result fish populations may be stressed.

WILDLIFE

> Summary of Impacts: The Montco Mine would temporarily destroy the existing wildlife habitat and deer travel lanes in areas being mined. The decades required for ponderosa pine/juniper revegetation and permanent loss of most of the breaks habitat would reduce deer cover. Additional hunting from population increase could cause reduction of wildlife populations in the part of Custer National Forest near the mine and on private lands open to hunter access.

Wildlife depend on vegetation for food and cover, with each species using different parts of the environment. Change within the vegetative community consequently changes wildlife populations. Mining would temporarily destroy vegetation used by wildlife for food and cover. This would eliminate (for the most part) wildlife use of areas disturbed by mining.

One goal of current reclamation practices is to restore plant cover as quickly as possible. The Montco Mine plan calls for reclamation to begin in year 6 and for direct backhaul techniques to be used. These plans would allow a quick start for reclamation. Habitat destruction due to the actual mine cuts would thus be a relatively short-term impact. Habitat loss attributed to construction of the facilities area, however, would be long term, since the facilities area would remain in place for 22 years. Approximately 169 acres would be disturbed in the facilities area; 41 would not be reclaimed but would remain as a transportation corridor.

Montco would partially offset habitat loss by enhancing 137 permit-area acres for wildlife. Wildlife cover structures, such as nest boxes and rock piles, would be placed on these undisturbed acres. Cattle grazing would be eliminated and human activity minimized.

Changes in habitat composition and interspersion would also cause long-term impacts. Table III-6 presents the total acres of disturbance and the habitats affected. One hundred twenty-three acres of ponderosa pine/juniper types would be disturbed and reclaimed. However, decades would be necessary before replanted trees would grow large enough to supply significant wildlife cover. Montco's plans to approximate premining density of conifers would require continued replanting to replace tree seedlings that die. Thus, populations of woodland birds would be temporarily reduced. Primary cavity nesters such as woodpeckers, which excavate cavities, as well as secondary nesters, which use existing cavities, would be most affected. The secondary cavity nesters include chickadees, nuthatches, mountain bluebirds, and American kestrels. Reclaimed habitat would include mourning dove nest cones, kestrel nest boxes, and dead trees for nesting and perching sites. Boulders and brush piles would supply microhabitats for small mammals, the main prey of kestrels and other raptors.

The loss of coniferous cover would adversely affect large mammals also. Ponderosa pine/juniper types provide travel lanes, thermal cover, and escape cover for deer. Mule deer are seldom far from escape cover, either topographic relief or vegetative cover. As a result, some of the reclaimed land may not receive optimum use by mule deer until replanted trees mature.

According to the Montco Mine plan, one of the habitat composition changes following reclamation would be the loss of 64 acres of breaks. Although effects on wildlife cannot be quantified, breaks were identified in the wildlife study as important mule deer habitat. Fifty percent of the winter mule deer sightings were within breaks habitat. Breaks were also important during early spring prior to snowmelt.

Reclamation plans specify reestablishment of the original acreage of total premining habitats. Although soil replacement proposals would promote some habitat interspersion (see Vegetation), habitats would still be in larger blocks than before mining. The result would be a reduction in habitat interspersion and "edges". Edges are areas that provide several varied habitats within a small area, allowing a species to use the habitat much more efficiently.

During mining, wildlife would probably avoid the lands adjacent to the mine. Human presence and noise may also stress wildlife populations, sometimes resulting in reproductive failure. However, the extent of this impact is unknown; it would depend on the species involved, the time of day, the year of disturbance, and the ability of species to become accustomed to mining.

Following is a list of impacts that would occur to specific species because of mining within the North King mining unit:

(1) The North King Mining unit differs from the mine plan area in that white-tailed deer and mule deer use the area year-round. Activity on the North King mining unit and associated facilities would disrupt two travel lanes used in movements from Tongue River bottomlands to Custer Forest uplands. As a result, many deer would have to establish new lanes to the north or south of mining activities.

Montco plans to reduce disruption of deer movements by both burying and elevating sections of the coal conveyor. Road signs would be posted to alert workers of deer crossings.

(2) Pronghorn antelope use the benchlands described in chapter II as fawning areas. In addition, the bench south of King Creek appears to be an attractive fawning site. The increase in activity and noise may displace animals using these sites.

(3) According to the permit application, several sharp-tailed grouse dancing grounds would lie close to disturbance areas but not be physically altered during the life of the mine. However, some nesting and wintering cover would probably be lost to mining. Pepper (1972) found that sharptails nest up to 1 mile from dancing grounds. Winter feeding areas usually lie between 0.2 and 3.3 miles from the grounds (Kobringer, 1965).

(4) The red-tailed hawk pair nesting along the permit area's southern boundary may desert their nest as mining activities and stockpiles approach. Another red-tail nest and a great horned-owl nest are within 0.25 mile of South Gate mining unit disturbances. These disturbances may cause nest desertion.

(5) The spring in section 5 is expected to dry up as a result of mining activity. This would be a loss of water for wildlife species. The loss would be partially mitigated by limiting cattle grazing and by placing waterfowl nest boxes around the reclaimed stock pond (section 9). Nest boxes would also be located in undisturbed stock ponds.

(6) Rare, threatened, and endangered species would not be adversely affected by the first 5 years of the mine. The Office of Surface Mining and the U.S. Fish and Wildlife Service concur with this funding (OSM, personal commun., March 23, 1984, USFWS, personal commun., April 4, 1984). However, cliffs potentially used as nesting sites for peregrine falcons would be monitored for reproductive activity during the spring. If peregrines are observed, Montco would consult with the Department of State Lands and the U.S. Fish and Wildlife Service to evaluate procedures for protection. In addition, prairie dog towns would be thoroughly searched for black-footed ferrets in the year prior to mining.

(7) An indirect impact that would result from the Montco Mine and additional mines expected to be built in the future stems from the increase in people in the Ashland area. The additional people are expected to increase recreational demands on the national forest and private lands. As a result, both legal and illegal hunter kills are expected to increase.

CLIMATE

Climate would not be measurably affected by the proposed mining operation. Particulate and gaseous emissions would be neither sufficient nor emitted at high enough altitude to interfere with atmospheric processes.

AIR QUALITY

Summary of Impacts: During the year of maximum production and surface disturbance, year nine, total suspended particulate (TSP) concentrations near the permit area would increase significantly over premining levels. Federal secondary and Montana ambient air quality standards (AAQS) would probably be exceeded outside the permit area due to emissions from the mining operation and traffic on FAS 566. Violations caused by increased traffic on the county road (FAS 566) would be very localized.

Montana and Federal primary AAQS would continue to be exceeded in Ashland--lower-respiratory illness and reduced lung function in children may thus increase. The major sources of TSP would be traffic on FAS 566 from Ashland to Montco Mine entrance.

Minesite Emissions

Dust emissions from the proposed permit area would consist of overburden, topsoil, and coal particulate. The dust would be emitted primarily during removal and hauling of overburden and wind erosion of disturbed areas (table III-7). These would account for 1,388 tons of particulate per year, over 85 percent of total emissions from the proposed permit area.

Coal dust emissions would be minor at 116.9 tons per year, or 7.6 percent of total emissions. Topsoil particulate emissions would be insignificant. Gaseous pollutant emissions from blasting and diesel fuel and gasoline combustion would also be insignificant (Montana Department of State Lands, on-file report, 1981).

Coal dust loss from unit trains may or may not be a significant air pollution problem. Although coal loss from unit trains is often estimated at one percent, no substantiation exists for this figure. More research is needed to determine the magnitude of the loss.

The increase in coal dust emissions on the Northern Cheyenne Indian Reservation would be insignificant (Science Applications, Inc. [SAI], 1981).

The maximum annual TSP concentrations caused by emission sources within the permit area would occur at a point approximately 0.5 miles northeast of the South King mining unit and would be about 45 ug/m^3 (annual geometric mean), equivalent to an annual arithmetic mean of 55 ug/m^3. Coal dust would be an insignificant portion of this increase (SAI, 1981). This would be the "worst case" situation, and would be about 2.5 times greater than premining concentrations. Even so, the effects, if any, on human health, wildlife, and vegetation would probably be insignificant.

TABLE III-7

Particulate Emissions from the Montco Mine at Production of 12 Million Tons of Coal Per Year

Source			Emissions Tons/Year
Topsoil			
1.	Scraper		8.9
2.	Hauling		8.5
		subtotal	17.4
Overburden			
3.	Drilling		1.5
4.	Blasting		7.4
5.	Removal		423.5
6.	Hauling		374.5
7.	Dumping		56.1
		subtotal	863.0
Coal Product			
8.	Drilling		0.2
9.	Blasting		7.9
10.	Removal		9.6
11.	Hauling		45.6
12.	Dumping at crusher		8.8
13.	Dumping at surge pile		11.5
14.	Primary crusher		1.2
15.	Conveyors		24.0
16.	Screening		6.1
17.	Secondary crusher		1.8
18.	Barn loadout		less than 0.1
19.	Train loadout		less than 0.1
		subtotal	116.9
Other			
20.	Wind erosion		391.1
21.	Access road		81.5
22.	Gravel road, Ashland-Montco entrance		3,347.0
23.	Space heating		3.8
24.	Diesel exhaust, mine equipment		58.0
25.	Diesel exhaust, unit trains		86.0
26.	Gasoline exhaust, mine vehicles		3.0
		subtotal	3,970.4
		TOTAL	4,967.7

Source: SAI, 1981; and DSL, on-file report, 1981.

Emissions from FAS 566

The major source of particulate emissions associated with the mine would be traffic on FAS 566, the gravel road from Ashland to the minesite. Assuming 330 light duty vehicles and ten heavy-duty vehicles (SAI, 1981) make the 11-mile round trip daily, annual particulate emissions would total about 3,350 tons per year (Montana Department of State Lands, on-file report, 1981), compared with 1,620 tons of particulate from all other mining activities. The air quality modeling done by SAI (1981) fails to include the gravel road as a source and therefore substantially underestimates the increase in TSP concentrations. With the gravel road included, the secondary Federal and Montana ambient air quality standards would probably be exceeded outside the proposed permit area boundary.

The TSP concentrations on the Northern Cheyenne Indian Reservation would increase slightly (SAI, 1981) and would not consume the Class I increment (table II-17). No comparison with the 24-hour increment was made because it was not a requirement at the time Montco submitted its air quality permit application.

Health Hazards

Exposure to pollutants in the mine would not pose a health hazard to mine employees. The National Institute for Occupational Safety and Health (Fairman et al., 1977) concluded that employment in surface coal mining was not likely to cause the development of either coal worker's pneumoconiosis, "black lung", or clinically significant respiratory impairment. The National Research Council (1981), upon examination of various mortality studies, concluded that exposure to diesel exhaust in surface coal mines does not pose a hazard of lung cancer or other cancers. There may be a hazard of emphysema, but further research is needed.

Both Federal primary and Montana AAQS are now exceeded at one monitoring site in Ashland; air quality would deteriorate further from the increase in vehicle traffic. The average daily count on the gravel road from Ashland to the mine entrance (FAS 566) was 115 in 1981 (see chapter III, Transportation), compared to the 680 that SAI (1981) estimates would occur during mining. This significant increase in traffic would cause a concomitant localized increase in TSP concentrations; the Federal primary and Montana AAQS would thus continue to be exceeded. The TSP concentrations in Ashland would be much greater than those estimated for the actual minesite.

This increase in TSP concentrations would possibly increase the frequency of lower-respiratory illness among Ashland residents, especially children (Hammer, 1976). Lung function in children may also be lowered (Air Quality Bureau, 1980, p. 105). Only those residents living close to FAS 566 would be exposed to the elevated TSP concentrations.

Mitigating Measures

Montco has proposed the best available control technology (BACT) for air pollution control measures throughout the mine: all conveyors would be covered; all transfer points, crushers, and truck dumps would be under negative pressure and a baghouse air filtration system; and the crushed coal would be stored in an enclosed structure also under negative pressure and baghouse systems.

Particulate emissions from the roads in and near the mine, however, could be reduced by additional measures. Paving the mine access road would reduce particulate emissions from the road by 70 percent; treating the road with a chemical stabilizer would reduce emissions by 20 percent. Neither of these would reduce total emissions from mine-associated activities by more than one percent. Particulate emissions could also be reduced to a small extent by (1) minimizing disturbed areas, (2) minimizing the fall distance in loading coal and overburden, and (3) maintaining the engines of the diesel haul trucks in top running order.

Particulate emissions and, therefore, TSP concentrations could be reduced substantially by paving the road from Ashland to the mine facilities entrance. The U.S. Environmental Protection Agency (1976) estimates that paving the road would reduce emissions by 85 percent. This would decrease particulate emissions from the road by about 2,850 tons per year, and would significantly improve the air quality of the area. Treating the road with a chemical stabilizer would decrease particulate emissions by 60 percent; frequent watering would lower emissions by 50 percent. These, too, would significantly improve air quality, especially in and around Ashland. A further method of reducing particulate emissions, regardless of the road surface treatment, would be to bus mine workers from Ashland to the mine.

EMPLOYMENT AND INCOME

Summary of Impacts: The Montco Mine would begin construction in 1985 and at full production would employ 560 persons. In Rosebud County, employment would thus become increasingly dominated by energy development; Powder River County employment would expand significantly. Neither Custer County nor the Northern Cheyenne Indian Reservation would experience significant indirect employment effects.

In the cumulative scenario, the dominance of energy employment in Rosebud County would be magnified. (The cumulative scenario assumes that four mines and one railroad connector would be built in addition to the Montco Mine and Tongue River Railroad mainline. (See Introduction) Powder River County would undergo the same sort of fundamental change in the employment pattern that has occurred in Rosebud County. Custer County would undergo a small increase in employment, mostly from the operation of the proposed Tongue River Railroad. The region as a whole would see coal mining replace agriculture by 1995 as the industry employing the most people.

Employment

Mine Employment

Construction of the Montco Mine (for the purpose of this EIS) is assumed to begin in 1985 with 25 construction workers and 20 permanent employees. Construction would peak the following year, with 450 construction and 40 permanent workers. Construction would end and production would begin in 1987 with 350 construction and 130 permanent workers.

Operations employment would increase continuously to 560 jobs in 1999, the year the mine would reach full production. Employment would remain at this level until 2004, then decline rapidly to 70 in 2008, the last year of reclamation. Some workers would be retained after this date to reclaim the minesite and dismantle the facilities.

(Unless otherwise noted, the information in this section is derived from the 1981 report by Mountain West Research, Inc. For a brief description of the model used by Mountain West Research, see appendix 6.)

Construction labor for the Montco Mine would come from three major sources:

(1) Northern Cheyenne.

(2) Other local. Local residents within commuting distance of the proposed mine.

(3) Nonlocal. Future in-migrants to the project area.

Of the total construction work force, 15 percent are expected to be Northern Cheyenne; 20 percent other local workers; 15 percent nonlocal highly skilled and managerial workers; and 50 percent other nonlocal construction workers. (See table III-8.)

TABLE III-8

Composition of the Construction Work Force

Year	Local Indian (15%)	 Other (20%)	Nonlocal[1] (65%)	Total
1985	4	5	16	25
1986	68	90	292	450
1987	53	70	227	350

Source: Mountain West Research Inc., 1981.

[1] Includes both highly skilled and managerial workers (15%) and other nonlocal construction workers (50%)

Operations labor for the Montco Mine would come from five major sources: nonlocal workers that have skills or managerial experience not available locally would make up 15 percent of the work force; Northern Cheyenne Indians, 15 percent; other local residents, also 15 percent; and other nonlocal people, about 50 percent. About 32 workers from the mine construction work force would also be available; the percentage would vary with the size of the total work force. (See table III-9.)

TABLE III-9

Summary of the Composition of the Operations Work Force

	Local				
Year	Indian (15%)	Non-Indian (15%)	Montco Construction[1]	Nonlocal[2] (Remainder)	Total
1985	3	3	0	14	20
1986	6	6	0	28	40
1987	20	20	10	80	130
1988	24	24	32	80	160
1989	29	29	32	100	190
1990	33	33	32	122	220
1991	38	38	32	142	250
1992	42	42	32	164	280
1993	50	50	32	203	335
1994	57	57	32	234	380
1995	60	60	32	248	400
1996	72	72	32	304	480
1997	72	72	32	304	480
1998	79	79	32	335	525
1999+	84	84	32	360	560

Source: Mountain West Research Inc., 1981.

[1] Montco construction workers who remain as a part of the operations work force when construction is complete

[2] Includes nonlocal workers that have skills or managerial experience not available locally.

The residential distribution of the Montco work force would determine, more than any other factor, socioeconomic impacts. Estimates of residential distributions for both the construction and operational work force are presented in tables III-10 and III-11.

Residential distribution was estimated under the following assumptions: Northern Cheyenne employed by the mine would probably not move and so were allocated to the reservation (Northern Cheyenne Planning Office [NCPO], December 17, 1981, p. 15. Other local workers were allocated according to the 1980 population distribution within the proposed mine's labor market area. The distribution of the nonlocal workers was based on (1) a review of the capability of potential communities to absorb additional population, (2) residential and commuting preferences of mine and construction woekres, and (3) transportation system characteristics.

TABLE III-10

Residential Distribution of Montco Construction Workers

Community	1985 Percent	1985 Number	1986 Percent	1986 Number	1987 Percent	1987 Number
Ashland						
Rosebud County	12.0	3	13.6	61	13.4	47
Powder River County	16.0	4	18.4	83	18.6	65
Billings	4.0	1	4.9	22	4.9	17
Birney	4.0	1	2.2	10	2.3	8
Broadus	12.0	3	10.2	46	10.3	36
Colstrip	24.0	6	24.4	110	24.6	86
Forsyth	8.0	2	6.7	30	6.6	23
Miles City	---	---	0.7	3	0.6	2
Northern Cheyenne Indian Reservation	16.0	4	15.1	68	15.1	53
Other*	4.0	1	3.8	17	3.7	13
TOTAL	100.0	25	100.0	450	100.1	350

Source: Mountain West Research Inc., 1981.

*Includes the remainder of Rosebud, Powder River, and Custer Counties.

Regional Employment

The employment pattern of the region would not be significantly altered by construction of the Montco Mine. Whether or not the mine is built, regional employment would peak at 14,633 in 1983, up 22 percent from 11,994 in 1980. The peak would result from the construction of Colstrip Units 3 and 4. (See fig. III-2.) Total employment would then decline rapidly over the next two years, despite the addition of 70 workers at Western Energy's Rosebud Mine. If the Montco Mine is built, 662 jobs would be added the following year, 1986, in construction, operations, and derivative sectors. Construction of the Tongue River Railroad would add about 390 jobs the same year.

Between 1985 and 1999 operations employment would gradually increase (table III-9), causing total employment to rise 5 percent to 12,660. There it would remain until Montco Mine production dropped off in 2004, when total employment would again begin to decline.

Therefore, in the near term, construction of the Montco Mine would neither lengthen the peak nor moderate the decline of construction employment peak created by Colstrip Units 3 and 4. In the longer term, operation of the mine would add to the region's increasing reliance on coal mining for its economic base. By the end of the century, the mine would raise employment in coal mining to nearly equal that of agriculture.

In the cumulative scenario, in which four mines more would be added to the study region, the employment pattern would be quite different. Total employment in this case would rise through a series of construction peaks, reaching a level nearly equal to that in 1983 once again in 1998. The dropoff

TABLE III-11

Residential Distribution of Montco Operations Workers

	Ashland				Birney		Broadus		Colstrip		No. Chey. Res.		Other*	
	Rosebud County		Powder River Co.											
Year	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
1985	20	4	30	6	5	1	10	2	20	4	15	3	0	0
1986	20	8	28	11	3	1	13	5	18	7	15	6	5	2
1987	19	25	27	35	4	5	11	14	18	23	15	20	6	8
1988	18	29	25	40	4	6	11	18	20	32	15	24	7	11
1989	18	34	25	48	4	7	11	21	19	37	15	29	7	14
1990	18	40	26	57	4	8	11	25	18	40	15	33	8	17
1991	18	46	26	66	4	9	11	28	18	46	15	38	7	17
1992	19	52	27	75	4	10	11	31	18	51	15	42	7	19
1993	19	64	27	90	4	12	11	38	18	59	15	50	7	22
1994	19	72	27	102	4	14	11	43	18	68	15	57	6	24
1995	19	76	27	108	4	14	12	46	17	69	15	60	7	27
1996	19	92	28	132	4	17	11	55	17	82	15	72	6	30
1997	19	92	28	132	4	17	11	55	17	82	15	92	6	30
1998	19	101	27	144	4	20	11	59	17	90	15	79	6	32
1999	19	108	28	154	4	21	11	63	17	96	15	84	6	34

Source: Mountain West Research Inc., 1981.

*Includes Forsyth, Miles City, the remainder of Rosebud, Powder River, and Custer counties.

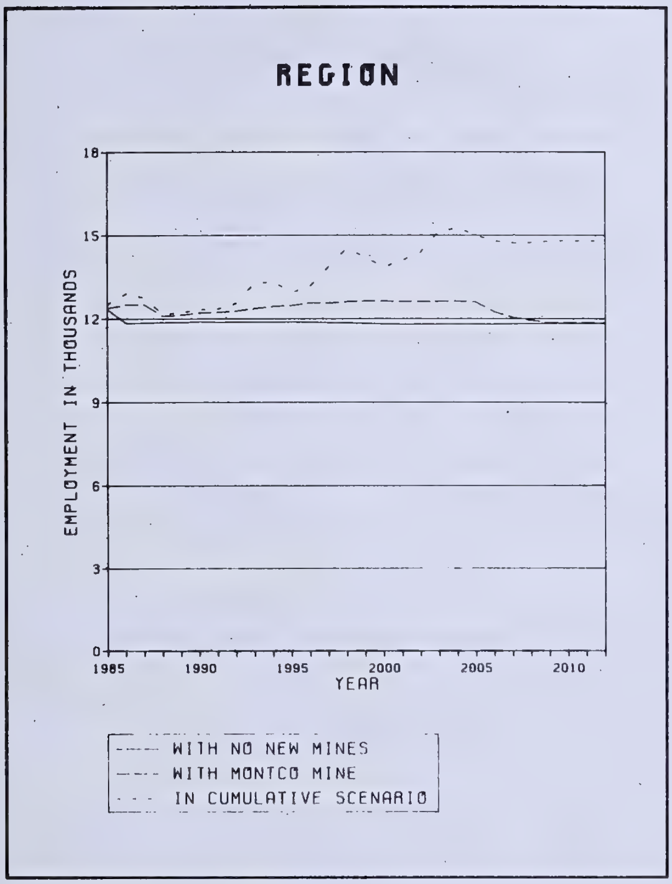

FIGURE III-2

Total Employment in the Region, 1980-2010

in employment at the close of the Montco Mine would not occur. Instead, the building of the last mine in the cumulative scenario would completely replace the jobs lost at Montco.

In 2003 employment in the cumulative scenario would temporarily surpass the peak of 1983. Total employment following this peak would remain slightly above the 1983 peak. Unlike in 1983, however, the jobs would be made up of positions in permanent operations, not temporary construction. Even following the close of the Montco Mine, by 2010 nearly 2,400 persons would be employed in coal mining by this time, fully 31 percent of the region's basic industry work force. Agriculture and TU (transportation and utilities), each providing 17 percent of the region's basic industry employment, would share second place.

Therefore, in the cumulative scenario, not only would coal mining replace agriculture as the region's single largest employer by 1995, by 2012 it would employ 80 percent more people.

Rosebud County Employment

The majority of work force additions from the Montco Mine would be in Rosebud County. The changing employment pattern here would thus be similar to the region's. (See fig. III-3.)

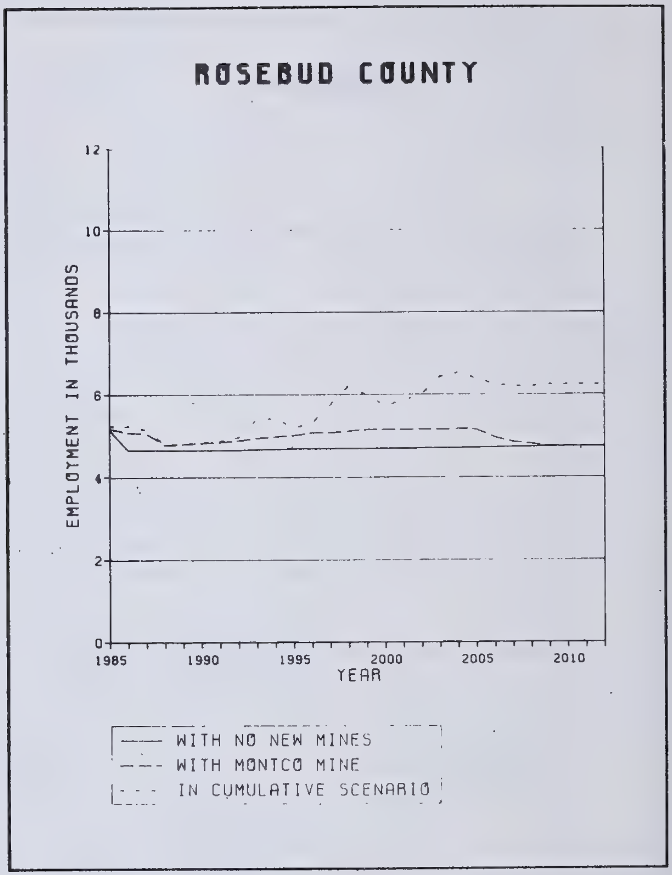

FIGURE III-3

Total Employment in Rosebud County, 1980-2010

At its peak, construction of the mine would create 425 jobs in Rosebud County, 64 percent of the total regional increase. This would raise total employment 9 percent above the level expected if the mine were not permitted to operate.

Operational employment would increase gradually, peaking in 1999. At that time there would be 2.4 times more jobs in mining than in agriculture. The peak total employment effect of the mine would be felt in 2004, when 458 jobs would result. This would represent about 56 percent of the total regional employment increase. Of the jobs created, 111 would be nonmine positions. Slightly more than half of these would be in the trade and services industries, mostly in Forsyth and Colstrip. The bulk of the remaining would probably be located only in Forsyth, because of its higher position in the trade hierarchy.

As an industry as a whole, mining employment in Rosebud County would surpass agricultural in 1982, even without the addition of the Montco Mine. With the mine, mining would provide more jobs than any other industry by the end of the 1980s. It would extend its lead throughout the 1990's. And by 2002, it would provide 1,069 jobs, more than 20 percent of the county's total.

In the cumulative scenario, these trends would be magnified. By 2012 employment in mining would be more than four times greater than in agriculture: 1,782 jobs would exist, 29 percent of total county employment.

The larger scale of cumulative development, however, would probably not produce a greatly different pattern of secondary job creation. By 2012 additional trade and services employment stemming from four active mines would amount to about 200 jobs, only 15 percent of the regional total and inadequate to significantly change the development pattern: although Ashland and Colstrip would attract some additional commercial development, they would remain first-order trade centers. Forsyth would continue to receive the bulk of the county's secondary trade, services, and, of course, local government increases.

Powder River County Employment

Operations of the Montco Mine would substantially increase Powder River County's employment base and delay the effects of declining agricultural and oil field employment. (See fig. III-4.)

The greatest effect of the Montco Mine construction would occur in 1987, when 217 jobs would be created in Powder River County, an 8 percent increase over what would otherwise be the case. This would represent about a third of the total regional employment increase. Of the total, three fourths would be made up of construction and mining jobs.

Operational employment in the county would build up gradually over the next 12 years, until the mine was in full production. During peak operation, the mine would create 322 jobs--a quarter of the county's total. Two thirds

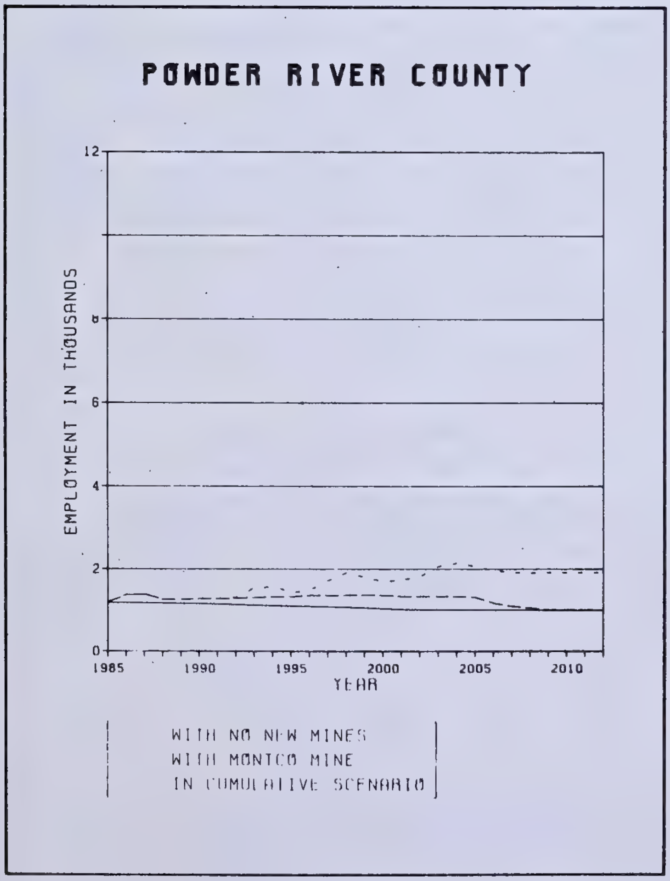

FIGURE III-4

Total Employment in Powder River County, 1980-2010 of the jobs would result from mine employment and about half of the balance would be in trade and services. As the mine was phased out of production, employment would return to the level that would have been the case without the mine. (See fig. III-4.) Agriculture would continue to be the industry supporting the most jobs in the county.

Should the cumulative development scenario occur in the way described, the same sort of fundamental change in the employment pattern that has occurred in Rosebud County would occur in Powder River County. Employment in mining would surpass employment in agriculture. By 2012 more than 500 persons or about 26 percent of all those with jobs would be employed in coal mining. Employment in agriculture would have declined to about 80 percent of its current level--to 410 jobs--and so would be in second place. Trade and services employment would be about twice as great as it would be if no coal development were to take place, amounting to 300 jobs.

In either scenario, the employment effects of the proposed mine would be concentrated in the Ashland vicinity of Powder River County and in Broadus. Broadus would receive almost all of the secondary trade and service job development, but this would be insufficient to raise the town to a second-order trade center.

Custer County

Custer County would not be significantly affected by the Montco Mine, because none of the miners are expected to settle in the county. The greatest employment effect would occur during the full production phase of the mine and would amount to 41 jobs, less than one percent of the total county employment. In the cumulative scenario, the effect would be greater, but still small: total employment would increase by 9 percent, mostly from the operation of the proposed Tongue River Railroad. (See fig. III-5.) In 2012, when coal shipments would be at the highest level, 261 of the 546 jobs that would be created in Custer County would result from the new railroad. Of the remainder, created mostly in Miles City, 183 would be in trade and services, and the balance distributed among other secondary industries. (See the ICC EIS on the Tongue River Railroad for a more detailed description of the impact of the project.)

Northern Cheyenne Indian Reservation

Although some Northern Cheyenne would obtain employment in off-reservation secondary development, the reservation would not experience a significant secondary employment impact. The most noticeable effect would be a small decrease in the reservation's unemployment rate.

Income

The construction and operation of the Montco Mine would significantly increase total personal income in Rosebud and Powder River Counties. Although per capita income would also go up, this would be the result of the increasing proportion of relatively high-paying mine jobs rather than an increase in the wage rates earned in other industries.

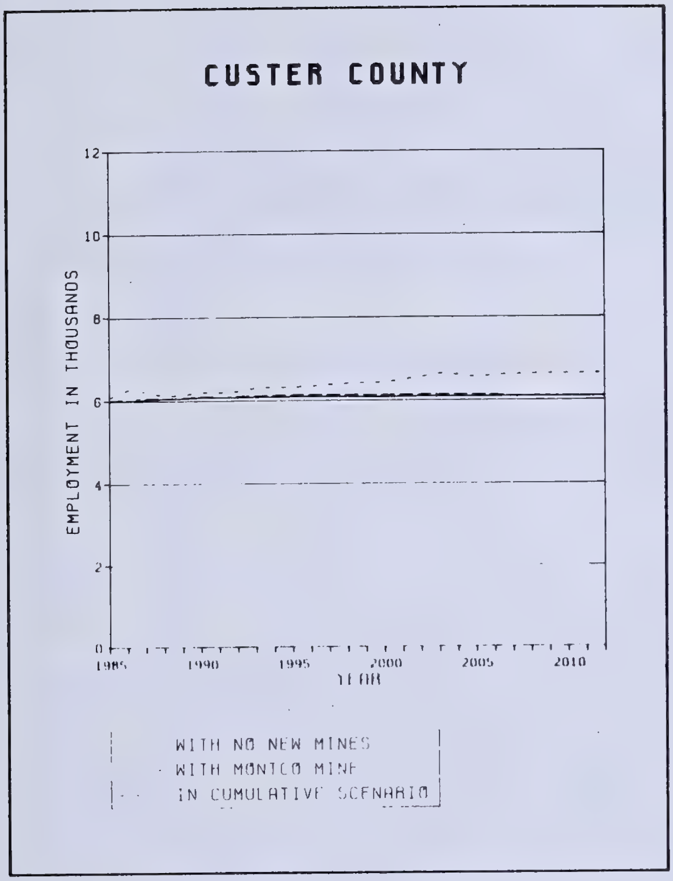

FIGURE III-5

Total Employment in Custer County, 1980-2010

The average mine worker would earn about $30,000 per year (in 1980 dollars). At peak operation employment the Montco payroll would amount to approximately $16,878,000 per year (Montco, written commun., February 2, 1981). Despite the dampening affect of the increased population that would result from the cumulative scenario, the region's per capita income would be about 6 percent higher.

SOCIOLOGY

Summary of Impacts: The population of the Ashland area is projected to increase 57 percent at most during construction of the Montco Mine and 91 percent, at peak, during the mine operation. The population of Rosebud County overall is projected to increase 8 percent during both mine construction and mine operation. Powder River County's population is projected to increase 37 percent at peak. Custer County would gain less than one percent.

Montco's development would slowly alter the social organization of the Ashland-Birney area by strengthening ties between these communities and the larger society, lowering the status of some individuals and groups while raising the status of others, diversifying the occupational structure and introducing new social values. The political process is likely to become more formal. The larger number of groups in the communities would make consensus more difficult. Without assistance the community is not likely to reach the consensus necessary to respond effectively to the demands of growth induced by the Montco Mine.

Demography

The model used to project the following figures is presented in appendix 6. Most of the following section is based on the 1981 report by Mountain West Research, Inc.

Population Increases from Development of the Montco Mine

Development of the Montco Mine would increase the population of Rosebud County by 880 persons by 1986. Montco construction would follow construction of Colstrip Units 3 and 4, which have already increased the county's population by about one third since 1980. As a result, Montco's construction would contribute only eight percent to the total increase in the county's population by 1986. Through 2010 the county's population would fluctuate, increasing by 8 percent at most from 1996 to 1998. (See table III-12 and fig. III-6.)

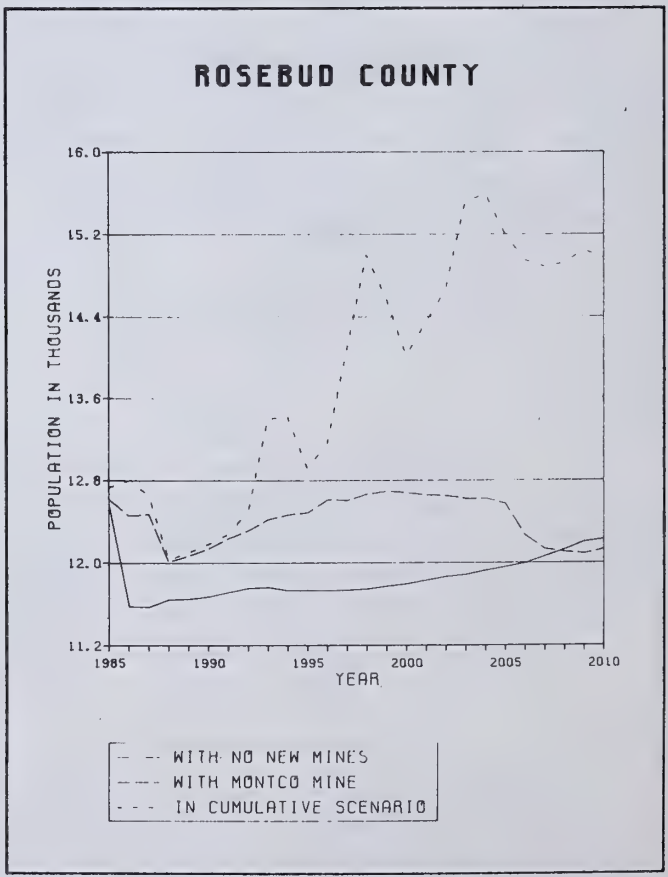

FIGURE III-6

Population of Rosebud County with No New Mines, with the Development of the Montco Mine, and with Development Induced in the Cumulative Scenario.

TABLE III-12

Population Impact by Community Resulting from Development of the Montco Mine

	Rosebud County		Ashland Area*		Birney Area		Colstrip		Forsyth Area	
Year	Number	Percent Change	Number	Percent Change	Number	Percent Change	Number	Percent Change	Number	Percent Change
1985	66	0.5	47	6	4	3	32	0.7	12	0.4
1986	880	8	426	55	27	19	495	13	131	5
1987	899	8	443	57	34	24	479	12	150	5
1988	367	3	197	25	17	12	205	6	53	1
1989	421	4	239	31	19	14	220	6	53	1
1990	467	4	276	36	21	15	230	6	64	2
1991	522	4	318	41	24	18	244	6	77	3
1992	558	5	347	45	28	21	251	6	87	3
1993	654	6	421	55	33	25	240	6	105	4
1994	726	6	476	62	37	29	317	8	118	4
1995	754	6	504	66	42	34	322	8	123	4
1996	876	7	614	81	45	37	378	10	142	5
1997	865	7	610	81	44	37	372	9	140	5
1998	917	8	658	87	48	41	386	10	149	5
1999	920	8	686	91	49	42	390	10	149	5
2000	845	7	645	86	47	40	368	9	141	5
2001	822	7	661	88	45	38	343	9	132	5
2002	779	7	651	87	43	36	320	8	125	4
2003	732	6	640	86	41	36	299	8	117	4
2004	693	6	632	85	39	34	280	7	110	4
2005	610	5	585	79	35	30	240	6	97	3
2006	265	2	294	40	16	14	96	2	41	1
2007	68	0.6	124	17	4	3	14	0.5	9	0.3
2008	–25	–0.2	37	5	–2	–2	–22	–0.6	–7	–0.2
2009	–115	–0.9	–48	–6	–6	–5	–54	–1	–21	–0.7
2010	–108	–1	–47	–6	–6	–5	–49	–1	–20	–0.7

*Includes the Ashland area of Rosebud County and the Ashland vicinity of Powder River County.

At peak mine construction the Ashland area would receive 30 percent of the region's total population influx--443 people, a 57 percent increase. At peak operation, the Ashland area would increase by 686 persons--91 percent above the population without the mine. (See fig. III-7.) Despite the increases, Ashland would remain a first-order trade center. (See Employment and Income.) The Rosebud County part of the community would compose 5 percent of the county's population, a one percent increase over the 1980 proportion.

The mine's construction would add 34 persons to the Birney area by 1987, a 24 percent increase. The operation period of mining would add 49 persons by 1999, or 42 percent more than the population without mining.

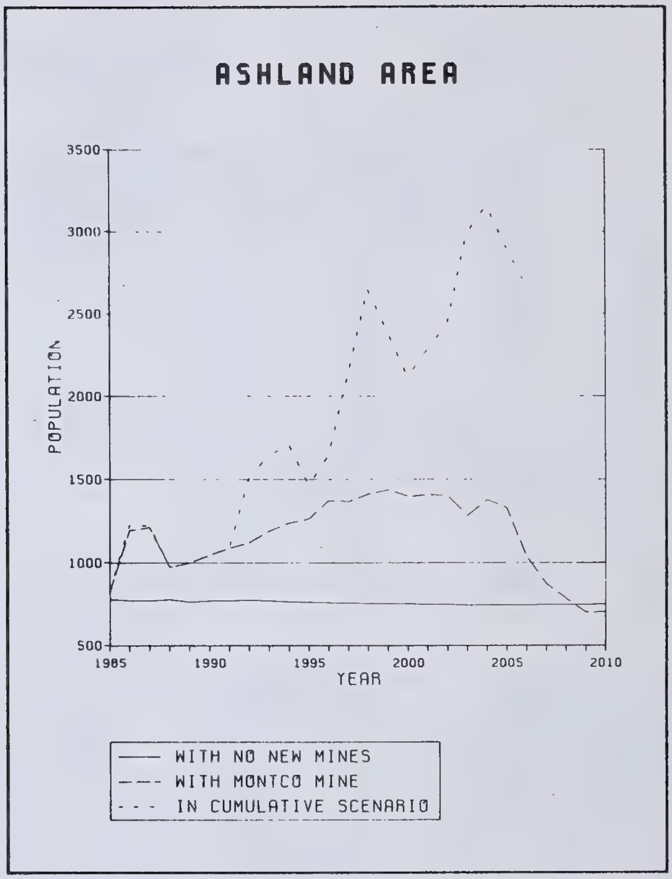

FIGURE III-7

Combined Population of Ashland and the Ashland Vicinity of Powder River County with No New Mines, with the Development of the Montco Mine, and with the Development Induced in the Cumulative Scenario.

Despite the number of jobs created by the mine, migration out of the area by young people probably would not decrease; young people would continue to leave for nonemployment reasons. Young people may, however, return to the area following time spent working elsewhere, or attending school, drawn by the expanded job opportunities.

The population composition in Ashland and Birney would shift with the mine to a larger proportion of people in child bearing ages, causing the rate of natural increase to rise, as births outnumber deaths.

Colstrip would gain 495 persons by 1986 from Montco Mine construction, 13 percent over the level expected with no new mines. This influx would be lower than the peak Colstrip would experience from construction of Units 3 and 4 in 1983. During the mine operations phase, Colstrip would gain a peak of 390 in 1999, 10 percent above the level expected with no mines. (See fig. III-8 and table III-12.)

Population increases in Forsyth from the Montco Mine would be due almost entirely to indirect employment. The population would increase during construction (1986 and 1987) and peak operation (1996-2001) by 5 percent.

Mine construction would increase Powder River County's population 20 percent, or 492, in 1987. Population would peak at around 840 additional persons in 1999 through 2004, a 40 to 45 percent increase. (See fig. III-9) Broadus and the Ashland vicinity of Powder River County would experience about 85 percent of the total increase.

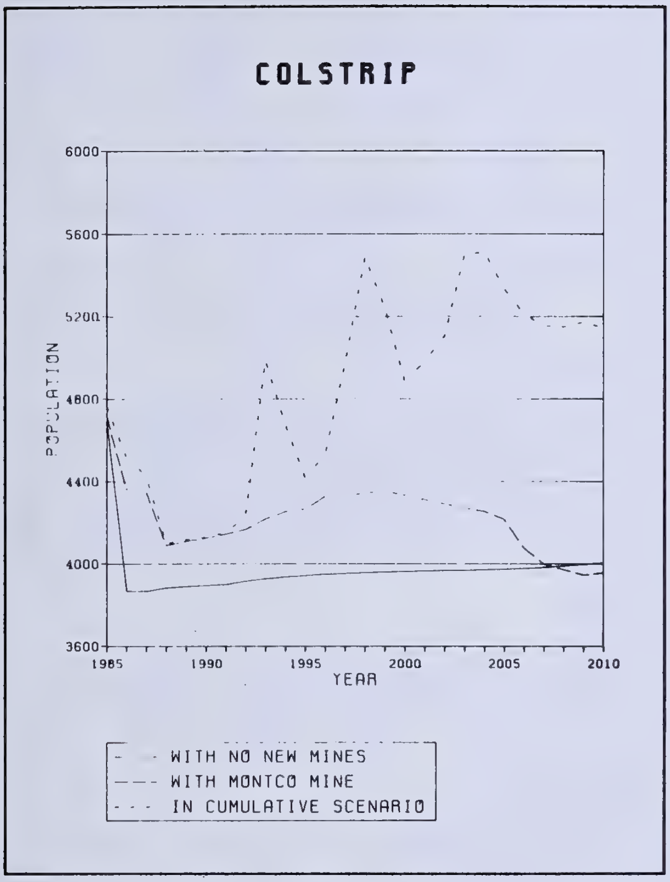

FIGURE III-8

Population of Colstrip with No New Mines, with the Development of the Montco Mine, and with the Development Induced in the Cumulative Scenario.

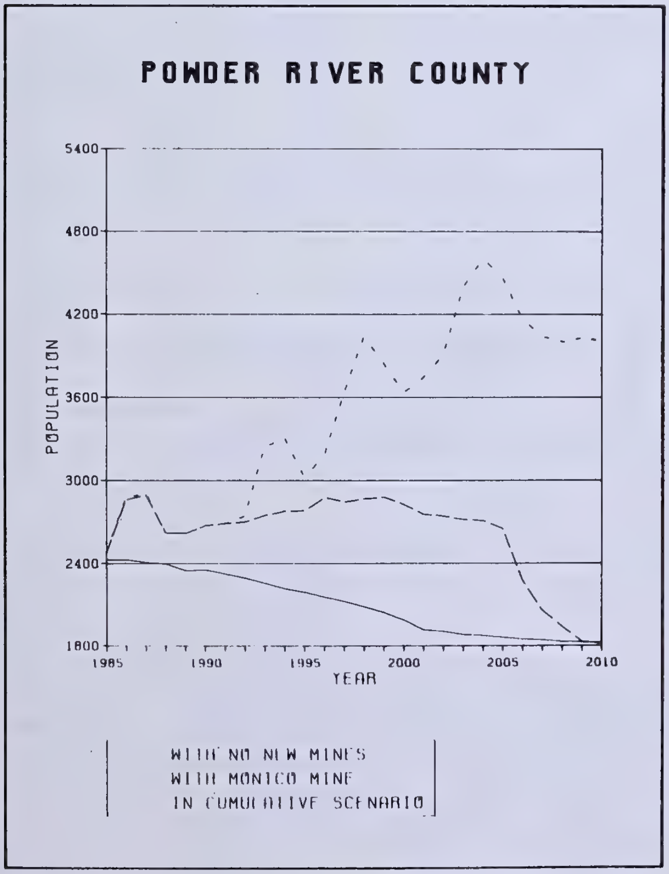

FIGURE III-9

Population of Powder River County with No New Mines, with the Development of the Montco Mine, and with the Development Induced in the Cumulative Scenario.

Broadus would grow 24 percent in 1987, or 179 persons, during construction of the mine. The population would peak at over 320 additional persons between 1999 and 2004, a 48 to 52 percent increase.

Custer County would be only slightly affected by the Montco Mine: the county would receive less than 7 percent of the region's population growth from mine construction. This increase would represent less than one percent of the county's population.

Population Increases in the Cumulative Scenario

With the cumulative development Rosebud County's population would increase by nearly 30 percent (density of 3 persons per square mile) by 1999. Without any new mines, the density would be 2.3; the 1982 density is estimated at 3.2. (The cumulative scenario assumes that four mines and one railroad connector would be constructed in addition to the Montco Mine and Tongue River Railroad mainline. See chapter I for details.)

The Ashland area would experience an influx of 2,412 persons by 2005, a 324 percent increase above their population without any mines. (See fig. III-7.)

Birney would experience a population influx of 82 persons in 1986. This figure would rise to a peak of 132 in 1998 and 188 in 2003. By 2010, the area would see a total increase of 117 persons, 100 percent more than if no new mines were developed.

In 1984 Colstrip would experience from cumulative development an influx of 652 persons. This figure would rise in 1998 to 1,530 persons; in 2003 to 1,529 persons; and in 2010 to 1,136 persons, or 28 percent more than if no new mining occurred. (See fig. III-8.) The high initial share that Colstrip would receive could be attributed to the housing and labor already available from construction of Colstrip Units 3 and 4. Over time, other areas of the county would develop a larger share of housing.

Forsyth, in the cumulative scenario, would see population increases primarily from rail and indirect (derivative) employment. Construction period peaks would take place in 1986 at an additional 197 persons, in 1994 at 340 persons, and in 2003 at 744 persons. Forsyth's total population increase in 2010 due to mine development would be 679 persons more than the population without new mines.

The Northern Cheyenne reservation would gain 73 more persons by 2010 as a result of cumulative development.

The cumulative scenario population impact in Powder River County would reach reach over 2,700 additional persons by 2004, a 144 percent increase over the county's population without any new mines. (See fig. III-9.) The county's population density would rise to 1.2 per square mile by 1999; without new mines the density would be 0.6.

Total construction-related population increases over the level expected with no new mines for Broadus are 183 in 1987, 425 in 1994, 695 in 1998, and 1,046 in 2004. By 2010 the total number of additional persons would be 855, 39 percent of the county's influx and 140 percent above what Broadus's total population would be if no new mines were built.

Little construction employment would take place in Custer County from early mine development; however, the county would gain 459 persons during railroad construction in 1986. By 2010, 18 percent of the region's mine-related population increases would be in Custer County (about 1,100 persons), making up 8 percent of the county's total population that year. This would have the overall effect of stabilizing the county's population, eliminating the decrease expected if no new mines were built.

Population peaks in Miles City would occur in 1986 at 362 more persons, in 2003 at 1,027 more persons, and in 2009 at 1,044. The remainder of Custer County would see an increase of 63 persons, or 4 percent, by 2010.

Social Organization

The social organization of the Ashland and Birney communities would change as a result of the development of the Montco Mine. The magnitude and duration of these changes after the end of mining is not known.

Extralocal Links

Coal development would greatly expand and strengthen ties between the Ashland-Birney area and the larger society. The communities are quite isolated now, especially Birney.

Some of these ties would be with government: provision of basic services for increased population would require more interaction between the Ashland area and Rosebud County. The regulatory role of Federal agencies, such as the U.S. Office of Surface Mining, and State departments, such as State Lands, Commerce, and Health and Environmental Sciences, would require more interaction with State and Federal government.

Other ties strenthened by coal development would be with Montco itself. As the communities expand, they may seek assistance from the company to meet the demands of growth. The company has not established a policy for assisting local communities and probably would not provide assistance without specific requests. Montco has set up a Community Development Program to provide information and assistance in preparation for taking a collaborative role in community development.

Still other ties that would be strengthened during coal development would be those with the coal industry as a whole. A link already exists between industry and locals that lease out coal or surface rights. With added coal development, even more money would flow into the local area, as wages and royalties. The flow into the community would create secondary money flow to local and regional business centers. How much money would be respent in the local area, relative to the amount that would leave, is unknown. Some businesses may expand into the Ashland area as the demand for goods and services increases.

The strengthening of all these ties raises three concerns. The first is that there is a tendency for economic power to be removed from the community by developments that increase the larger society's significance in local affairs. In the Ashland-Birney area, therefore, coal development would put land use and employment decisions increasingly in the hands of the coal industry and therefore outside the local area.

The second concern, expressed by local residents surveyed (see chapter II), is that newcomers may not be interested in the local community. Newcomers would maintain some of their past associations and orientations with outside communities.

The third concern raised by the strengthening of outside ties is that the presence of government would grow. Already, because of proposed coal development, the Ashland community has established a tie with the Montana Department of Commerce, through the Coal Board, which granted the community $1,120,065.00 (Barbara Sheline, Montana Department of Commerce, oral commun., December 1981). There has been increased contact with personnel from other State and Federal agencies that have collected information and held public meetings for this impact statement and other State and Federal coal documents. Additional contact may create a perception by locals that they have increasingly less control over decisions affecting their community. Cumulative development would further strengthen the link with the Coal Board and could result in links with other government agencies.

Stratification

Coal development would introduce new individuals and positions that over the long run would lower the status of some individuals and groups while raising the status of others (Christi Branch, Mountain West Research, Inc., [MWRI], 1982). The economic base would shift, significantly decreasing the importance of agriculture. Ranchers in Rosebud County have already lost some of their former influence as large scale coal development has made mining and power generation an important sector of the county's economy. (See Employment and Income.)

Currently, in the Ashland-Birney area, length of family history, business ownership, and size of land holdings are the major determinants of social esteem. With the Montco Mine, wealth and income could become more important.

In the DSL Survey (1981) 18 percent of the adults in the study area stated they would benefit economically from development of the mine. Approximately 168 local people would be expected to work there, including 84 Northern Cheyenne. (See Employment and Income.) All would probably improve their economic status, particularly the Northern Cheyenne, whose income as a group is low. Some local businessmen would also improve their position, through increased trade; they would become less dependent on the Northern Cheyenne for their livelihood. Landowners who have leased their coal to Montco would improve their economic position also.

On the other hand, the relative economic status of those who do not benefit financially from the mine would decrease. The average yearly salary of the Montco Mine workers would be about $30,000. These workers and their families would have more money than many locals, half of whom made less than $24,000 in 1980 (DSL Survey, 1981). If local prices were to rise from mine development, locals that did not benefit would actually find their financial condition deteriorating. Moreover, if they compared their income with that of the mine employees, they might feel in a lower position.

Development of the mine would increase the number and type of jobs available to locals. Newcomers would provide competition for these jobs as well as increase competition for existing jobs. Montco has no hiring policy now that would give preference to any group.

Concern was expressed in the DSL survey that local prices would rise; it is not known if prices would rise more than elsewhere in the region or the nation. Inflated land prices were mentioned as a potential disadvantage to locals. Montco alone would probably not affect the price of agricultural land, but the presence of a railroad and renewed Federal coal leasing could contribute to increased prices for land with privately owned surface and minerals because the coal would be more accessible.

In the Ashland-Birney area residents expressed concern that newcomers would garner political strength and outvote long-time residents. Because Ashland is already fragmented, an organized group of newcomers could easily redirect the town's actions. The political structure of the Birney community, on the other hand, would probably not change much because (1) few mine workers would live in the community and (2) the current residents of Birney, though split over the coal development issue, still form a cohesive community. Nonetheless, in both Ashland and Birney, as new, powerful individuals and groups enter the area, the influence of local political elites could diminish. Conversely, energy development could give these communities more influence in county and State government, thereby increasing the status of some locals (Kristi Branch, MWRI, personal commun., March 1982).

In the short-term, mine employees new to the area would also have low social esteem from locals because they would be viewed by many as transient. They would gain respect slowly as they indicate a commitment to the local area, such as by purchasing a home or joining in community activities. The criteria for acceptance in the community would probably have to change before newcomers would gain esteem more quickly (Kristi Branch, MWRI, personal commun., March 1982).

As a result of shifting and inconsistent status within the community, individuals may experience stress. For example, an individual may maintain a position of prestige based on family history and economic position, but lose influence in local decision making to a new, powerful group in the community. Stress may also result between people, as their status relative to one another changes.

Cumulative development would further decrease the importance of agriculture in Rosebud and Powder River Counties.

Differentiation

The occupations, social values, and political processes in the Ashland and Birney communities would diversify as the population grew. To begin with, the diversity of occupations in Ashland and Birney would expand as new jobs are created in the mining sector.

In addition, recreation preferences may change, as newcomers with different lifestyles arrive. In Colstrip, for instance, sports such as tennis and racquetball that require special facilities are popular. (See Recreation.) Although the overall pattern of recreation activities of Colstrip residents does not differ much from those of the study area, people in the Ashland-Birney area are still concerned about conflict. Residents fear that recreationists may trespass, damage personal property, leave gates open, increase traffic on rural roads, or demand recreational facilities locals can do without. Moreover, many feel opportunities for recreation are inadequate now and the situation would worsen with growth.

A third area of change may be in values. Some residents feel that the values of newcomers might differ from those of locals, making it difficult to maintain present values. New values, interests, and practices would be introduced to the communities. Most affected by the widened range of values might be young people that form their values during population influx (Freudenberg, 1979). The research that indicates this effect, however, was conducted in a community that experienced a much greater population increase over a shorter period of time than the Montco Mine would produce.

Affected also by value change might be local women, whose background may differ substantially from those of arriving women. Locals may prefer traditional roles and lifestyles; newcomers may demand new and different services, such a day care, found in their former communities. These differences may slow the mixing of, and cooperation between, locals and newcomers (Bureau of Land Management [BLM], p. 150).

Some locals see the potential influx of new ideas and practices from the larger society as an advantage (DSL Informant Interviews, 1981). But others believe that newcomers should adopt the ways of the community's current members. If newcomers settle in Ashland or Birney, their ties with other communities would probably diminish, replaced by an orientation toward the new community. They may choose to become part of their community as it exists now or challenge the way the community operates now. Such a challenge would create conflict between community members.

Another area of change may be with the decisionmaking process. If current leaders continue to fill formal positions, most decisions would still be made in an informal fashion, unless newcomers demanded a more formal process to ensure their involvement in decisionmaking. But if these positions of authority were to be filled by new people, decisionmaking would probably become more formal, because newcomers would not be familiar with community members and the current system.

The Ashland community structure would not respond well to a large population influx and would have trouble controlling the town's growth, because consensus is difficult to reach between the groups in the community. In Birney, by contrast, the influx would probably not alter the decisionmaking structure as much, because the community is more cohesive. In any case, there could be advantages to newcomers becoming involved in the local political system, for they may have organizational experience that would help the community accommodate growth.

The result of all these changes would probably be that the communities would remain differentiated even after the mine were completed because some of the interests and values of newcomers would remain. This would not be as unusual in Ashland as in Birney because, first, Ashland has a fairly diverse occupational structure, second, many different groups live in the community now, and third, the area has experienced population fluctuation in the past, primarily from the forest products industry.

An indirect result of the change brought about by the mine may be an increase in the crime rate. In the DSL survey, some Ashland-Birney residents stated that they would feel less secure with more people in the area. Others mentioned that they expected crime to increase, especially trespass. An increase in population would raise the actual number of crimes committed even though the rate of crime might not rise. Although increases in crime rates have been cited as a consequence of energy development, such increases may have resulted from improved record keeping and more formal handling of violations.

Cumulative development would further broaden the range of values and interests in the communities of Ashland, Birney, and Broadus.

Integration

The expansion of the mining sector would increase the number of social groups in the Ashland-Birney area. Reaching a consensus may thus become even more difficult in Ashland. If a threat is perceived from the population influx, the residents may pull together. But this is unlikely, because the community is fragmented now.

Instead, coal development is likely to result in a more formal political process. For example, residents might choose to incorporate Ashland. New people would seek to have their views considered by decisionmakers and the community would probably seek assistance from the mining company or the Montana Coal Board.

No united group now has the authority to plan for the community's growth. The incentive to plan may have been stymied by the overbuilding of the water and sewer system in anticipation of unrealized growth. Nevertheless, the Ashland community would need to plan before an influx of new people.

Development of the Montco Mine could result in less coordination between the people of the Birney community if the two groups--those favoring development and those opposed--become more polarized.

The Northern Cheyenne may find it more difficult to gain acceptance in the community. In field interviews, many residents voiced concern that newcomers might misunderstand and, as a result, intimidate further the Indian people.

A few people interviewed were also concerned about how well local people would accept newcomers.

Cumulative development would make integration even more difficult as many new groups would be added to the local communities.

Family Structure and Well-Being

Families already in the area and those new to the area could be affected by the Montco Mine in two ways. Directly they could be affected by changes in family income, the occupation of family members, or the opportunities available to family members. Indirectly, they could be affected by changes in the family's environment, such as the relationships between community members, opportunities for new friendships, the availability of services, the quality of housing available, and changes in neighboring patterns with family and friends.

A number of specific impacts would affect families in the Ashland-Birney area. The first involves women. The number and type of jobs available to women would increase, although the pay scale for jobs such as waitress and clerk would probably remain the same. New jobs in mining would provide an opportunity for women to earn better wages than those typically available in rural areas.

A few women interviewed in the Ashland-Birney area said they would likely apply for a job at the mine. Few women are likely to be employed directly by Montco because "few women belong to the mining and construction unions, and apprenticeship and equal employment opportunity programs have been very slow to change the situation." More important, "increased participation in mining or construction would require women to work in very nontraditional occupations...general attitudes of both men and women in the rural communities of the West appear to be opposed to this change" (BLM, 1980, p. 149).

This increase in the number of roles open to women would be viewed as an advantage by some women. But changing roles and lifestyles can cause stress for others (BLM, 1980, p. 149).

Impacts on children and adolescents are also likely to affect families in the Ashland-Birney area. Official rates of disorders such as child abuse have often been found to rise in a community following a rapid increase in population. Such findings are questioned by some researchers, however, for they may in part stem from more accurate record keeping, or from a high proportion of parents in the child rearing ages in the populations studied. If parents and children find life stressful, increases in child abuse can be expected. This may be an indirect result of inadequate use of support systems, such as kin, neighbors, friends, and helping agencies.

Adolescents, too, may have a particularly difficult time adjusting to a growing community. One study finds that teens in a rapidly growing community "feel worse about their school, their area, the energy growth, the government, their teachers, their peers, and their lives in general" than similar students in communities not experiencing rapid growth. It is not known if these negative attitudes and behaviors are permanent. (Freudenberg, 1979, p.19) In fact, some studies suggest less of this kind of impact is occurring than has often been reported.

Another impact to families in the Ashland-Birney area could result from an increased number of divorces. Some studies have cited increased divorce rates from energy-related growth; others have found no substantiation for the claim. (Thompson, J.G. et al., 1980). Even though the rate may not rise, however, the number can be expected to rise along with population growth. An increase in the divorce rate could result from a change in the age structure of the area's population, resulting in a greater proportion of people in the ages that are more likely to divorce.

How these impacts on individuals would affect the functioning of the family unit is unkown. Additional research is needed on the family before impact predictions of this kind can be made.

An indirect effect of mine development would be a feeling of loss of privacy to local residents, caused by more traffic on county roads.

Northern Cheyenne

The Northern Cheyenne that would be most affected by the mine are those that would be employed by Montco and those that live in Ashland and the Ashland and Birney districts of the reservation. These areas lie nearest the minesite and settlement of newcomers.

The majority of employed Northern Cheyenne now work for the government (Northern Cheyenne Planning Office [NCPO], August 1981). The Montco Mine would employ about 84 Northern Cheyenne in the coal industry. This would expand the importance of mining to the Northern Cheyenne economy, strengthen the tie between the Northern Cheyenne and private business, and facilitate the Northern Cheyenne's assimilation into the mainstream of American society (BLM, 1980, p.145).

Assimilation, however, may be unwanted. Even if they became absorbed into non-Indian society, the costs to the Indian people might be great (BLM, 1980). Cultural change would mean an increasingly stressful life (BLM, 1980).

The Northern Cheyenne have a number of concerns over mine development. First, they worry about increased conflict both among themselves and with non-Indians. Such conflict could arise from the changing values and lifestyles of those employed at the mine, who would have daily contact with non-Indian society. These mine employees would make more money than most other Northern

Cheyenne and thus be able to buy more goods and services. They may also gain influence in tribal politics and therefore influence the Northern Cheyenne's tribal position on coal development within the reservation.

The money earned at the mine by the Northern Cheyenne would bring increased reliance on a cash economy and increased exposure to other values. This could indirectly decrease the incidence of communal living, resulting in the conveyance of Cheyenne customs and language becoming more difficult. The practice of families and their relatives living together nurtures the transfer of traditions and Cheyenne knowledge. In particular, the Northern Cheyenne are concerned that abrupt changes brought about by the Montco Mine without any mitigating measures could destroy the sense of family and community cohesion that has maintained and characterized the Birney district as traditionally Cheyenne (NCPO, August 1981). In addition, subsistence activities (hunting, gathering, etc.) may decrease with the increased use of cash.

Another concern of the Northern Cheyenne is over cross-cultural contact. About one-third of all those surveyed disapprove of an influx of non-Cheyenne into the Ashland area; nearly 60 percent of those surveyed in the Birney district disapprove of such an influx. Despite disapproval, contact would increase, both from non-Indians moving into the area and from mine workers commuting across the reservation from Colstrip. Conflict could thus arise. In addition, increased contact could result in more intermarriage. This, in turn, might hasten the eventual loss of the Northern Cheyenne as a people (NCPO, December 1981).

Another concern of the Northern Cheyenne is that the influx of non-Indians would intensify competition in social activities and cause social frustration. More interaction with non-Indians may promote family problems. The Northern Cheyenne feel coal development would also exacerbate alcoholism and other chemical abuse (NCPO, December 1981). Alcoholism and drug abuse are now overwhelmingly considered by the Northern Cheyenne as the most serious social problems on the reservation (NCPO, August 1981).

A further concern of the Northern Cheyenne is that mine development would increase demand for community services that are strained now. Non-Indians moving into the area are not expected to live on the reservation, but the population on the reservation would increase substantially, approximately 31 percent, over the life of the Montco project. This growth would occur almost entirely from more births than deaths, not from in-migration.

Additional concerns of the Northern Cheyenne are discussed in Ethnobotany, Cultural Resources, and Recreation.

The magnitude of these effects on the Northern Cheyenne is not known. Little research has focused on the changes communities undergo as a result of energy development and the specific response of the Northern Cheyenne would be heavily influenced by their culture (BLM, 1980, p.144). Any negative impacts would worsen with cumulative development.

Mitigating Measures

The sudden population influx created by mine development would have a variety of social impacts. These could be reduced if the company hired local people to work at the mine. Training programs at the mine and at Dull Knife Memorial College would increase the number of qualified locals.

The Northern Cheyenne fear degradation of their lifestyle and culture from increased cross-cultural contact with white people. To reduce this potential problem and decrease use of the reservation's recreation sites by non-Indians, a commuter bus for workers living in Colstrip could be provided. This would also reduce traffic on rural roads, considered by some current residents as a major disadvantage of the mine.

Potential conflict between the Northern Cheyenne and newcomers could be reduced by education courses on the Cheyenne's unique culture. The Northern Cheyenne may object to this, however, since it would increase unwanted cross-cultural contact.

Local residents are anxious over the uncertainty of mine operations. Frequent public information meetings by the company would reduce this and provide a forum for the airing of concerns.

Owing to the sudden population influx, integration of new people into the communities near the mine would be slow. Integration could be facilitated by the communities if gatherings were held. In addition, local business or service clubs could sponsor a community acquaintance program to help newcomers become familiar with local services, resources, and people.

Research on communities over a long period of time would improve the accuracy of social impact projections. Such an improvement would mitigate some of the negative effects of mine development; much of the difficulty a community facing possible development encounters results from the uncertainty of how the community would be affected.

COMMUNITY SERVICES

Summary of Impacts: The development of the Montco Mine would adversely affect the quality and strain the quantity of (1) Rosebud County's law enforcement system, health services, solid waste disposal system, and library facilities; (2) the Ashland-Birney area's schools; (3) Forsyth's general government and water storage facilities; (4) Powder River County's law enforcement system and health services; and (5) Broadus's general government, water storage, and public works staff. In addition, the housing supply of the Ashland vicinity of Powder River County, Broadus, Forsyth, Colstrip, and Ashland would be inadequate.

In this section, the impacts discussed refer to the strain on service quantity and quality above the demands discussed in Chapter II, Community Services. Most of the section is based on the 1981 report by Mountain West Research, Inc.

Rosebud County

Housing

The housing impact in Rosebud County would first be felt in 1985, the year mine construction begins. At the mine construction peak, in 1986, 275 more housing units than would be present without the mine would be needed. This figure would fall with the completion of mine construction to 108 units in 1989, rise again to a peak of 273 in 1999, and finally fall to 18 by 2012.

In the cumulative scenario, in which four additional mines would be added to the area, the rise in housing demand would be amplified: 115 more units would be needed than would be required with Montco alone in 1986. (For a discussion of the cumulative scenario, see the Introduction) Housing demand would then fluctuate, reaching 995 units more than Montco would require by 2010.

Public Safety

Montco would result in a need for two additional officers in 1986 and 1987. In the cumulative scenario this figure would rise to six by 2009. The proper distribution of these officers in a county-wide patrol plan would be a key factor in meeting the needs in the nonincorporated area.

Health and Welfare

An additional physician would be needed from 1985 to 1987. The county already needs seven physicians above the existing level to meet the needs of the county even if no new mines are built. In the long term, one additional physician would be needed between 1996 and 2002 if Montco alone is built. If cumulative development occurs, two or three additional physicians would be required after 1997.

The termination of funding of Federal programs which now provide medical support in Rosebud County would substantially alter the quality and availability of medical care, regardless of the level of mine development.

Construction of the Montco Mine would increase the need for hospital beds in 1987 by 15 percent, or four beds. Operation of the mine would not further increase hospital bed demand. Cumulative development, however, would require 7 to 14 additional beds between 1993 and 2009, up to a 53 percent increase above the existing level.

In addition, Montco would create an additional need for two more emergency medical technicians in 1987, one ambulance in 1986, one public nurse in 1986, one sanitarian in 1986, and 300 square feet of space for public health nurses in 1986. The need for these facilities and personnel would fluctuate through 2012, but would not exceed the requirements during the construction years.

Cumulative development would create long-term requirements for physicians, dentists, hospital beds, emergency medical technicians, ambulances, and public health nurses after 1990 that are substantially above the requirements of Montco alone.

Facilities and Services

With development of the mine three acres annually would need to be added to the present solid waste disposal site to meet requirements after 2003. Although no other public works facilities would be affected substantially by Montco, cumulative development would require additional space and staffing for the county shop. In 1986 and 1987, three additional staff members and 2,100 additional square feet of shop space would be needed. Long-term needs would call for eight persons and 5,600 square feet.

An additional 500 square feet of library space would be needed to accommodate use generated by Montco's development. In the cumulative scenario,

three additional library staff members would be needed through 2010. Cumulative development would increase the space needed beyond the level Montco alone would require beginning in 1994. This need would peak during construction of the additional mines at a maximum of 1,900 additional square feet in 2007. Greater use of mobile library facilities and expansion of the library in Forsyth would alleviate this impact.

No additional social service workers should be needed in Rosebud County in fiscal year 1984 due to the Montana Coal Board Grant. Unless part or all of the grant is renewed or other funding sources are found, a personnel shortage is likely after 1985. Montco development contributes little to expected service demand and the possible deficiency will arise whether or not the mine is built or the cumulative scenario occurs.

Ashland and Birney

Housing

The Ashland area would face large housing shortages during the mine construction phase. In 1986 housing demand would be 30 percent, or 62 units, greater than without the mine. This surge, taking place in a single year, would demand a correspondingly sharp jump in housing supply. Housing demand would then decrease to 28 additional units needed in 1998, then climb to a peak of 84 additional units by 1999. Demand would then fall through 2012.

The cumulative scenario would raise housing demand by 1993 to 70 units above the demand created by Montco. Housing demand would fluctuate with this development through 2010. By 2004 demand would reach a peak of 287 units above the demand created by Montco--alone an increase of 142 percent.

The Ashland area's response to this need would be determined primarily by the availability of construction contractors and financing. Ample land would be available because a major landowner in the area is developing a subdivision south of Ashland. The community would grow in a southern or easterly direction, because the Tongue River floodplain and the Northern Cheyenne Indian Reservation block growth in other directions.

Montco Mine operation would also increase housing demand in the Birney area by about 13 units by 1999. Cumulative development would increase demand another nine units by 1997. Birney's ability to meet this demand would depend on two factors: (1) the willingness of a few local landowners to develop their land and (2) the willingness of builders to pass up larger projects elsewhere to build instead in the Birney area. Although housing demand would be significant in Birney, it would be small compared to other areas nearby.

Public Works

Although Ashland's water demand would rise with development of the mine, the increase would not exceed existing capacity. In the cumulative scenario, however, demand would exceed capacity by 1997, requiring a long-term 27,000-gallon increase over existing supply.

The existing sanitary sewer system and the 12-acre lagoon would handle all projected sewage demand if the Montco Mine alone is built. In the cumulative scenario, however, the lagoon would temporarily need another acre in 1998 and two more in 2003 to meet demand through 2004.

Education

With the Montco Mine three more teachers (above the current 11) would be needed in the Ashland elementary school between 1994 and 1998. Beyond 1998, enrollment would decline until 2012, when only five teachers total would be necessary. In the cumulative scenario, added mine development would raise demand for teachers beyond the current 11 beginning in 1992. Demand would increase to a total of 21 in 2010 and peak at 23 in 2003.

State standards indicate the Ashland Elementary School has adequate space for the additional students that Montco would contribute; however, this space may not be designed appropriately for this number of students. In addition, the ratio of space per student may not be considered adequate by local standards. Additional facilities may be needed.

In Birney, demand induced by the Montco Mine in 1984-86 would peak for about 600 additional square feet for the elementary school. After this period, falling enrollment would cause space needs to drop below existing capacity. Cumulative scenario development, in contrast, would require one more teacher at the elementary school beginning in 1993 and a permanent addition of 1,000 square feet to the current size of the school building. This expansion could change the character of the school, now staffed by only one teacher.

It is assumed for this analysis that a high school would be built in Ashland even without the Montco Mine to meet the needs of the area's population. A 24-acre site would be needed. Additional space requirements resulting from the mine would not be significant; however, temporary classrooms would probably be necessary between 1992 and 2005. The peak demand in this period would be in 1999, when about 5,362 additional square feet would be necessary to accommodate the 40 students the Montco Mine would add to the high school enrollment. As for staff, long-term needs stemming from the mine would require two more teachers over the level needed if no new mines were built.

In the cumulative scenario, mine development would require similar staffing and space until 1993. Then four more permanent teachers, as well as one additional teacher for peak demand in 2003 and 2004, would be needed. This would raise the total permanent number of teachers to nine.

If a high school is not built, sufficient transportation to bus students to other high schools in either Colstrip, Broadus, or Sheridan, Wyoming, as well as adequate facilities and manpower at those schools, would be needed.

Colstrip

Housing

Housing demand in Colstrip spurred by Montco Mine development would begin in 1985 and peak in 1986 at 162 additional units. Demand would fall slightly in the late 1980s, rise until 1999, then begin to decline. The added demand would dissipate by 2010.

In the cumulative scenario, mine development would have a much greater impact. Housing demand would peak temporarily in 1986 at 208 additional units, then fall to 67 by 1988. As more mines are constructed, demand would rise rapidly to 495 additional units by 1998 and remain in the 300 to 500 range through 2010.

Colstrip may be able to supply the needed housing. In 1982, construction on Colstrip Units 3 and 4 pushed housing demand to a peak of 2,371 units. The Montana Power Company provided housing units or mobile home pads for most of this demand. Cumulative development would then raise demand to 2,383 units in 1985, but thereafter demand would not approach the unit 3 and 4 peak again through 2010.

Colstrip's ability to respond to this demand would be complicated by two factors. First, many two-family lots are scheduled for conversion to single-family lots once Units 3 and 4 are completed. Second, the availability of these units in the long term is highly uncertain, because of the high cost of construction in Colstrip.

Forsyth

Housing

Montco Mine development would push demand for housing units to a temporary peak of 43 in 1986 and 47 in 1987. Demand would peak again by 1996, at 57 units, then decline to six by 2012. Demand in the cumulative scenario would follow a similar pattern: it would peak temporarily at 62 additional units in 1986 and 105 in 1994. Then it would decrease slightly for two years, followed by a climb to 247 units by 2010.

The Forsyth area's capacity to respond to this would depend on its response to the peak demand caused by construction of Colstrip Units 3 and 4. Since the town met the demand in 1982, it would probably be capable of meeting the demand of the Montco Mine. Whether it could meet demand in the cumulative scenario, in contrast, would depend on the local construction industry and Forsyth's willingness and capacity to expand its residential areas. Cumulative scenario demand would be 10 percent above the peak that would occur in 1985 if no new mines were built.

Facilities and Services

Montco Mine development would not necessitate additional government staff above the nine that population-based standards suggest. Forsyth officials, in fact, consider the present staff of seven to be adequate. In the cumulative scenario, government would require eleven persons, according to population-based standards.

Development of the Montco Mine would require approximately 85,000 gallons of storage capacity in 1998 above the amount needed if no new mines were built. Water storage capacity requirements with cumulative development would reach 1,833,000 gallons by 2011, an increase of 359,000 gallons above the level required if no new mines were built.

The secondary employment effects and spillover population from the Colstrip and Montco Mine construction work forces would increase demand for teaching staff by one or two teachers. In the cumulative scenario, demand would surpass this one or two in 1992, increasing to four or five and remaining there through 2010.

Powder River County

Public Safety

The police force would need to add two sworn officers during the construction years of 1986 and 1987 to meet demand through 2012, whether Montco Mine alone is built or the cumulative takes place. The operation of the Montco Mine would require the same two additional persons or fewer. In the cumulative scenario, mine development would require eight officers, or four above the number if no new mines were built. In practice, the distribution of patrol units throughout the county would be as important in meeting future demand as would the staffing level.

Health and Welfare

Powder River County now has only one doctor. Another physician would be needed whether or not the Montco Mine is built. In the cumulative scenario, a total of three physicians would be needed by 1993, as well as a fourth one-year temporary physician in 2003. One additional dentist would also be needed in 1993.

As in Rosebud County, the cutback of Federally funded physician recruitment incentive programs may seriously jeopardize the county's ability to recruit and maintain necessary medical manpower.

Patient stabilization and transfer services would need to be improved whether the Montco Mine alone is built or the cumulative scenario occurs.

The part-time worker now serving Powder River County may need to devote all his time to serving the county beginnning in 1985 or 1986. The increased need of about one-half worker would be mostly attributable to Montco Mine development.

Broadus

Housing

Fifty-two additional housing units would be needed in Broadus in 1987 whether Montco alone is built or the cumulative scenario occurs. This demand would halve the next year, when Montco construction slows, increase to 95 by 2004, 28 percent above demand without the Montco Mine, then decline to 14 in 2012.

In the cumulative scenario, this figure would peak at 300 in 2003, 87 percent above the demand without any new mines and 61 percent above the number of units required as a result of Montco Mine development.

Broadus's ability to respond to this demand would probably be restricted only by the availability of construction contractors and financing. Land availability would not be a problem: although a floodplain restriction and high real estate prices may have hampered past growth, the town now has plans for expansion to the north and west.

Facilities and Services

The Broadus administrative staff would need to be increased from two to three persons in 1986 whether the Montco Mine alone is built or the cumulative scenario takes place. With Montco alone this need would drop to two persons by 2006. In the cumulative scenario four persons, as well as additional office space to accommodate them, would be required by 2010.

Broadus's existing water supply could easily accommodate the demand Montco Mine development would add. Water storage, however, would be inadequate from 1986 through 2010; demand would temporarily peak at 73,000 gallons above the existing level in 1989. In the cumulative scenario, water supply would fall short by 2003: long-term demand calls for 15,000 gallons of supply above the existing level. Moreover, water storage capacity would require additional capacity through 2010, peaking at 348,000 gallons in 2006.

Adequate shop space exists to handle additional demand attributable to either the Montco Mine or cumulative scenario development. The capacity of shop staff, however, would be exceeded. To alleviate this, one additional person would be required temporarily in 1985, and a second between 1994 and 2004, if the Montco Mine alone is built. In the cumulative scenario, four additional persons, totaling seven, would be needed by 2010.

Ashland Vicinity of Powder River County

Montco Mine development would increase housing demand to a temporary peak of 74 additional units in 1987, a 69 percent increase above demand without any development. Demand would later grow to another peak of 134 additional units in 2004, then drop by 2009, when Montco operations would have ceased, to the same level expected without any mine development.

In the cumulative scenario demand would grow with slight fluctuations. By 2010 demand would increase another 396 units over the number that would be needed with the Montco Mine alone. This demand would be about four times the demand expected without any new mines.

Landowners in the part of Powder River County near Ashland have indicated their desire to subdivide land, and they are supported by their County Commissioners, who usually approve rural subdivisions. The area's ability to respond to housing demand, however, could be hindered by the lack of construction contractors and financing. The lack of centralized sewer and water facilities in the area might also pose a problem for dense housing development. Sparsely-settled residential subdivisions could rely on septic tanks and individual wells.

Northern Cheyenne Reservation

Many community services, such as housing, water supply, and community waste disposal systems, are not expected to receive impacts, since no mine-induced population increase is projected for the reservation. Only those services tied to increased commuter or recreational traffic, such as law enforcement and perhaps some health services and social services, are likely to receive impacts.

Additional law enforcement requirements are likely to strain an already inadequately staffed tribal police force. Increased enforcement demands are most likely to involve traffic violations, motor vehicle accidents, and recreational resources. (See Recreation.)

Health service impacts are not easily determined. Some increase in motor vehicle accident rates would place a slight burden on the clinic and the ambulance service. These services appear to be adequate for absorbing additional clients but the unknown mix of Indian/non-Indian new clients complicates prediction of new service provision demands.

Social, welfare, and mental health services may also receive increased demand but how much and the portion attributable to Montco Mine development cannot be determined. Projection of mine-related demand would have to make an assumption about additional stress (social and psychological) being placed upon Northern Cheyenne people. Another assumption would be that increased stress would lead to some proportion of increased service utilization to remove either the stress or stess-induced social and personal problems. Not enough is known to determine how much stress would be created or how much would be treated by social, welfare or mental health services.

Mitigating Measures

(This section, is based on the 1981 report by Mountain West Research, Inc. For further detail, the reader should refer to the report.)

Housing

The strain on housing that would arise from development of the Montco Mine could generate serious worker and worker-dependent dissatisfaction. A major hindrance to solving potential housing problems is that neither Montco nor a single public agency could resolve all the problems that would arise. Nonetheless, below is a list of actions that could be taken in mitigating the housing problems created by Montco Mine development.

§ Establish a construction camp near the minesite to house single workers and couples without children.

§ Provide information to the public and to builders about housing needs and preferences.

§ Work with local officials and developers to design strategies for providing housing in the area.

§ Provide financial assistance to builders by guaranteeing that units would either be leased or sold at a previously negotiated price.

§ Provide rental guarantees or subsidies to builders of new units or owners of existing units.

§ Cosign construction loans, enabling builders to borrow more capital for construction of more or larger units.

§ Assist local lending institutions in obtaining capital to make loans to prospective buyers.

§ Inform large builders about the housing market in the area. Encourage involvement from local builders.

§ Encourage and facilitate comprehensive plans and designs for housing development to avoid scatter development, sprawl, and poorly designed mobile home parks.

§ Build housing for rent or purchase.

§ Offer low-interest loans to employees.

§ Establish a rental service for employees that would match available rental units with individuals and families seeking affordable housing.

Facilities and Services

The following are actions that could be taken in mitigating the strain on facilities and services that would occur with development of the Montco Mine.

§ Provide engineering and technical assistance to aid in design and costing of needed facilities.

§ Donate the use of heavy equipment for facility construction.

§ Provide technical support to planners and local officials.

§ Purchase needed office equipment for local jurisdictions.

§ Donate needed capital facilities at all levels of government.

Education

The following are actions that could be taken in mitigating the strain on education facilities produced by the mine.

§ Provide land for school expansions.

§ Donate temporary classroom units, or purchase and lease them to school districts.

§ Purchase additional school buses.

§ Provide housing for teachers, to encourage teachers to relocate to the area.

Health Services

To mitigate the strain on health services caused by the mine, recruitment programs for doctors, dentists, and other health professionals could be instituted.

FISCAL CONDITIONS

Summary of Impacts: The State of Montana would receive most of the tax revenue generated by the development of the Montco Mine. Adverse fiscal impacts arising from the mine would fall on local government and school districts. The severity of these would vary both between jurisdictions and, over time, within jurisdictions. Two common types of fiscal problems would result: first, project-generated revenues would not be available to all affected jurisdictions. This would upset the fiscal balance of Powder River County, Broadus, Broadus's schools, Colstrip's schools, and Forsyth. Second, revenues generated would not be available during the years of project-induced expenditures. This would cause net revenue shortages for Rosebud County and the yet-to-be-built Ashland high school.

In the cumulative scenario (see introduction), these problems would be aggravated. Expanded long-term permanent and peak temporary population influxes would require larger capital outlays, primarily in the early 1980s, several years before any additional tax revenue would be available. Later, however, taxable valuations for most the jurisdictions affected by the Montco Mine would swell. Thus, during the 1990s and beyond, the property taxes would provide all essential funding.

(This entire section is derived from the 1981 Montco Technical Report by Mountain West Research, Inc.)

State

The proposed mine, like other mines in the cumulative scenario, would generate State revenues primarily through the Coal Severance Tax, the Resource Indemnity Trust Tax, personal income taxes paid by miners, the Corporate License Tax (a State income tax), property taxes paid into the Equalization Fund of the State School Foundation Program, and royalties from State coal.

Assuming a contract sales price of $7.50 per ton (1980 dollars), the mine at full production would pay Coal Severance Taxes of about $27 million per year. Other coal taxes would provide an additional $700,000 per year. Over the life of the mine, these taxes would amount to about $428.3 million.

Yearly personal income tax receipts from Montco miners would peak in the year 2005, when the State would collect about $675,000. Over the life of the mine, the State would collect about $10.9 million.

The Corporate License Tax would peak at about $900,000 per year at full production. Over the life of the mine, the State would collect about $14.0 million.

Revenues to the School Foundation Program (which include the state portion of the Gross Proceeds Tax) would reach nearly $2 million per year at full production and total more than $30 million over the life of the mine.

The cumulative development scenario would produce much more revenue. By 2010 coal taxes would total more than $1.1 billion, personal income taxes, about $32.6 million, and the School Foundation Equalization Fund revenues, about $83 million.

About 71 million tons of State coal would be mined during the life of the mine (Lanny Icenogle, oral commun., February 22, 1982). Since current State leases would expire before the coal would be mined, new royalty rates would be at least 12.5 percent of the F.O.B. price of the coal, considerably higher than the current rate of 17.5 cents per ton. The royalty rate would amount to about $1.56 per ton (in 1980 dollars). This would produce State royalties of about $111 million over the life of the mine.

Rosebud County

For the first five years, the Montco Mine would require more expenditures by Rosebud County than the mine would pay in taxes (at the current tax rate). The county would therefore have to raise the property tax rate by perhaps 3 mills--a 20 percent increase over the present amount--to fund an equivalent level of services. Over the life of the mine, however, the additional revenue collected by the county as a result of the proposed mine would surpass the additional cost induced by the mine. The surplus, if accumulated, would amount to $10 million (in 1981 dollars). Since counties are required to operate with a balanced budget, the revenue surpluses would not in fact occur, but rather the tax rate would go down.

The cumulative scenario would produce a similar pattern--revenue shortfalls (i.e. higher tax rates) in the initial years followed by long-run revenue surpluses (i.e. lower tax rates).

Assuming that additional elementary school space will not be needed no major negative fiscal impacts would occur in the Ashland elementary school district from the Montco Mine. (See services.) Increases in the district's taxable valuation would from the beginning greatly surpass the additional expenditures caused by the mine. The cumulative scenario would not produce a significantly different result.

Except for the year that a new high school is assumed to be constructed, the taxable value increases resulting from the proposed mine would easily support the operation of a new Ashland high school district with boundaries similar to the elementary district. The cumulative scenario would not produce a significantly different pattern.

Because the proposed mine would not contribute to the Colstrip school district's taxable value, the costs of the elementary district would exceed revenues attributable to the Montco Mine. Even so, these adverse impacts would be insignificant because of substantial additions to the elementary district's tax base by Units 3 and 4. In the cumulative scenario, the fiscal impacts would be greater but still within the capacity of the district to absorb without a significant increase in taxes.

Fiscal impacts to the Colstrip high school, Forsyth schools and city government would be negative but minimal whether Montco alone is built or the cumulative scenario takes place.

Powder River County

Because the proposed Montco Mine would only indirectly add to the Powder River County tax base, serious negative fiscal impacts would result. Revenue would fall short for about the first 20 years of the mine's activity. This would exacerbate the projected erosion of the tax base from declining oil production. Beginning in the early 1990s, the county would need to increase the tax rate by as much as 50 mills (compared to the 1980 rate of about 31 mills), to maintain services.

In the cumulative scenario, the revenue shortfalls would not last as long but would still be serious. Increasing coal production would not make up for the declining oil production taxable value until the turn of the century.

The tax base in the town of Broadus would also benefit only indirectly from coal development. Broadus would consistently incur revenue shortfalls similar to but smaller than those incurred by Forsyth from coal development in Rosebud County.

Whether the Montco Mine alone is built or the cumulative scenario takes place, the Broadus elementary school district would sustain revenue shortfalls. Neither the proposed nor the projected mines would directly increase the district's tax base, but all would cause enrollment to increase.

If only the Montco Mine is built, revenue shortfalls would also hit the Broadus high school district. In the cumulative scenario, however, coal production would replace oil production as the major source of the district's taxable valuation, allowing the district to manage additional costs.

Custer County

Custer County's fiscal outlook would not be significantly affected by the Montco Mine.

Northern Cheyenne Indian Reservation

Because population would not increase on the reservation from the proposed mine, the tribal government's fiscal outlook would not be significantly affected.

Federal Government

The proposed mine would generate Federal revenues primarily through Federal royalties, the Black Lung Excise Tax, the Corporate Income Tax, and the Abandoned Mine Reclamation Fee. The Black Lung Excise Tax would produce about $0.50 per ton or $6 million per year at full production and $93.0 million over the life of the mine. The Corporate Income Tax would produce about $5.9 million per year at full production and $92.0 million over the life of the mine. The Abandoned Mine Reclamation Fee would be $0.35 per ton or $4.2 million per year at full production.

The cumulative scenario would produce much more revenue, particularly since the other mines in the scenario would produce Federal coal and thus pay Federal royalties.

LAND USE

> Summary of Impacts: The proposed mine would not significantly affect the pattern of land uses in the region. The mine area would temporarily change from grazing to mining uses. The potential productivity of the reclaimed surface would be somewhat less than its current potential, but actual productivity could be greater.

Permit Area

About 621 acres in the North King Mining unit and facilities area would be disturbed. Eighty-one percent of this area is now used for grazing, about 3 percent is used for alfalfa production. (See table III-4.)

The pattern of postmining land uses would be similar to the premining pattern except that some breaks-type wildlife habitat would be lost (see Wildlife) and a small amount of alfalfa and water impoundment acreage would be gained. (See table III-4.) Because of unavoidable disruption of the soil, the potential productivity of the reclaimed surface would be slightly less than that of the undisturbed surface, but this would not affect the land use pattern, since the actual productivity could be greater. (See Vegetation.) Agricultural production would not be noticeably changed in the region by the temporary change in the permit area from agricultural to mining uses.

Mine Plan Area

About 5,500 acres of the 10,200-acre mine plan area would be disturbed over the life of the mine. Almost all of the land that would be disturbed is currently used for grazing; a small part is used for cropland and ranch headquarters.

The pattern of postmining land use would be nearly identical to the premining pattern. The only significant difference would be a slight increase in the number and size of water impoundments, which would be established at the request of the current landowner. The same sort of reduction in potential productivity expected for the permit area would occur in the entire mine plan area. (See Vegetation.) If properly managed, however, the actual productivity of the reclaimed surface would be greater than its current level.

Cumulative Scenario

During the 28-year cumulative scenario, about 24,500 acres in addition to those at the Montco Mine would be disturbed by mining. Each area disturbed would be removed from agricultural production for an average of 7 years (ICC, 1983, pp. A1-22, A1-24). (See chapter I for a description of the cumulative scenario.) About 98 percent of the land that would be disturbed is now used for grazing; the balance is cropland. The loss in agricultural production would reduce agricultural cash receipts by about $1.4 million during the 28-year period, or about 1.8 percent of the total of Rosebud, Powder River, and Custer Counties in 1979 (ICC, 1983, p. A1-25).

About 800 acres of land would be permanently converted from agricultural to urban uses due to the expected expansion in housing, public facilities, and commercial and industrial sites caused by development in the cumulative scenario (ICC, 1983, p. A1-26). Land use changes for the communities of Colstrip, Forsyth, and Miles City would be neither disruptive nor incompatible with existing uses. In Colstrip, current community development activities associated with the construction of Units 3 and 4 would accommodate the projected population increases stemming from cumulative scenario development. Miles City and Forsyth are large enough to absorb without disruption the relatively minor land use changes expected. By contrast, in Ashland and Broadus land use changes would be significant: population growth would increase the amount of land devoted to urban land uses by about 230 acres in Ashland and 120 acres in Broadus.

Tongue River Railroad

The Tongue River Railroad would require as much as 1,762 acres for a right-of-way (ICC, 1983, p. A1-2). One thousand four hundred thirty-five of these acres are now used for grazing, 112 for cropland, and the remainder for other uses. In addition to these, the use of an additional 1,062 acres would be lost, because the railroad would sever and thus isolate parcels of land too small or irregular to continue in their present use (ICC, 1983, p. A1-6). Two occupied dwellings, 13 existing or planned irrigation systems, and a few of a variety of other capital improvements would be displaced or otherwise affected by the proposed railroad (ICC, 1983, pp. A1-2, A1-8). A detailed description of the land use impacts of the proposed railroad is contained in the EIS prepared by the Interstate Commerce Commission (1983).

TRANSPORTATION

> Summary of Impacts: The most significant change in the transportation system resulting from the proposed mine would be the construction and operation of the proposed Tongue River Railroad. (See fig. III-10.) Increases in highway traffic, particularly in the cumulative scenario, would make improvements such as paving, widening, realigning, and bridge enhancement necessary on some road segments. The type and timing of improvements would depend on road condition and increases in traffic.

Highways

The largest growth in traffic from the Montco Mine, the other mines in the cumulative scenario, and the development of the Tongue River Railroad would occur on the following segments: FAP 39 between Colstrip and Lame Deer, FAP 37 between Lame Deer and Ashland and Ashland to Broadus, FAS 566 between Ashland and the Montco Mine, and other secondary roads in the Ashland vicinity, depending on the location of the cumulative scenario mines. (See fig. II-9.) These roads would be most affected because they are the transportation links that join the areas that would experience the largest population increases and they are the roads that would be used by mine workers for their trips to and from work (ICC, 1983, p. A3-33). Table III-13, presents the traffic increases projected for selected road segments during selected years of the cumulative scenario. Traffic increases were projected by adding new work trips and other population-increase-related trips to current traffic volumes.

Due to the projected volume increases directly attributable to the cumulative scenario, only about 5 miles of the region's primary highways would require improvements (ICC, 1983, p. A3-37). This mileage is low because much of the region's primary highway system already needs improvement, particularly FAS 37 (U.S. 212) between Lame Deer and Ashland (Montana Department of Highways, 1978, p. 135). Maintenance costs during the 28-year period of the cumulative scenario would also increase by about $14 million because of increased traffic (ICC, 1983, p. A3-38).

About 34 miles of unpaved secondary highway would need paving as a result of traffic volume increases. About 6.6 miles of FAS 566 and 6.2 miles of FAS 484 would need to be paved around the turn of the century. At almost $500,000 per mile, secondary highway improvements would cost about $16 million (ICC, 1983, p. A3-39).

About 4 miles of FAS 566 would be temporarily relocated to avoid the loadout loop at Montco and some short sections of the proposed railroad right-of-way. In the life-of-mine plan, an additional 9.5 miles of the road would be relocated.

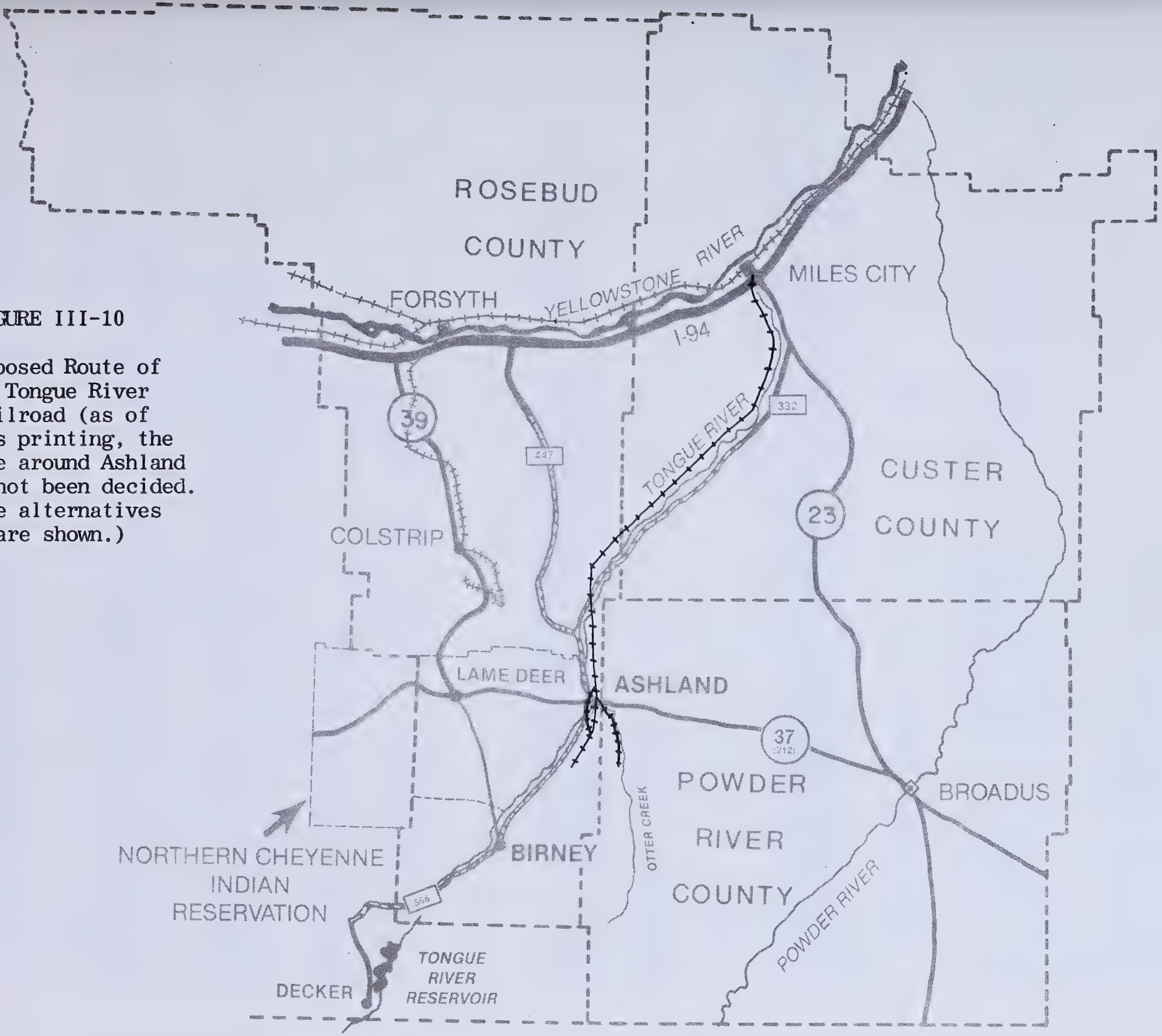

FIGURE III-10

Proposed Route of the Tongue River Railroad (as of this printing, the route around Ashland had not been decided. The alternatives are shown.)

TABLE III-13

Current and Projected Traffic Volumes, 1981-2011
Cumulative Scenario

Road Segment	1981	1991	2001	2011
FAP 39				
I-94 to Colstrip	1,200	830*	1,020*	1,110*
Colstrip to Lame Deer	560	557	985	1,280
FAP 37				
Lame Deer to Ashland	940	1,437	2,484	2,910
Ashland to Otter Creek Road (FAS 484)	740	860	2,481	3,520
Otter Creek Road to Broadus	680	650	1,695	1,970
FAS 566				
Ashland to Montco Minesite	115	722	1,272	215
FAS 484				
U.S. 212 to Minesite #2 and #3	110	110	1,143	1,950

Source: ICC, 1983, p. A3-34.
*Adjusted downward from original estimate to account for temporary increase due to construction of Colstrip Generating Units 3 and 4 during 1981.

Railroad

Significant effects on highway traffic due to construction of the railroad are not expected. A service road would be established within the proposed Tongue River Railroad right-of-way. Maximum use of it and the advancing rail line to transport materials and labor would minimize the effects of construction on highway traffic.

A direct effect of the operation of the railroad on transportation in the region would be the delay of vehicles at rail and highway crossings. In turn, vehicular delays could have repercussions on emergency service deliveries, community development and travel patterns.

Only a small percentage of total trips within the region would be delayed by Tongue River Railroad trains. The percent of total trips delayed would range from less than 0.3 percent in 1986 to 2.0 percent in 2011. The delays at some crossings would be higher than these area-wide percentages (ICC, 1983, p. A3-3).

The consequences of delay for fire emergencies would include increased property losses. As for medical emergencies, the percentage of cases in which a delay would be critical for patients is small. Emergency services in Ashland would not be affected by the Tongue River Railroad trains because the only public crossing proposed for the Ashland area would be an overpass. The impacts to emergency services due to the Tongue River Railroad are detailed in the ICC EIS.

The region's trip delay statistics indicate that overall trip-making would not be significantly affected by Tongue River Railroad trains (ICC, 1983, p. A3-7). However, the new rail line and additional train traffic may influence the location of new residential development in and around Ashland, be responsible for more than half of the delayed trips in Miles City, and about 17 percent of the delayed trips in Forsyth, where the most serious traffic and service disruptions would occur (ICC, 1983, pp. A3-4, A3-8).

Mitigating Measures

Mitigating measures are detailed in the ICC EIS (ICC, 1983, p. A3-9 et seq.). The only action recommended is the installation of crossing-warning devices. Nearly 45 percent of the crossings affected by Tongue River Railroad trains would need such devices if the proposed railroad ships the amount of coal mined in the cumulative scenario.

RECREATION

Summary of Impacts: Conflict between local residents and newcomers that arise from recreational activities, overuse of the Ashland Division of the National Forest, and crowding and shortages of recreational facilities would be the major impacts on recreation from the development of the Montco Mine.

Social Impacts

Northern Cheyenne and Ashland-Birney area residents are concerned about the impact newcomers will have on recreation. The Northern Cheyenne fear that increased use of the reservation's recreation areas would increase litter, worsen road conditions, pollute ground and surface water, lower personal safety, increase violations of trespassing and hunting ordinances, increase damage to livestock and agricultural land, and increase vandalism. (Northern Cheyenne Planning Office [NCPO], December 1981, p. 4). Although fishing and camping use by off-reservation people did not increase between 1975 and 1981, despite a 10 percent rise in Rosebud County's population, use of the reservation's recreation resources may increase with the Montco Mine, because most newcomers would settle near the reservation and commuters would cross the reservation from Colstrip.

Ashland-Birney area residents are concerned that newcomers may demand different facilities. A comparison of Colstrip residents' preferences with those of people from the Ashland-Birney area shows that little difference exists, with few exceptions: Colstrip residents do not participate in rodeos or ride horseback and Ashland-Birney area residents do not bicycle or play tennis or racquetball.

Many residents of the Ashland-Birney area believe that newcomers would drive as a form of recreation. Additional traffic could result in anxiety for some area residents who feel uncomfortable with strangers around.

Local residents are also concerned that newcomers would reduce recreational enjoyment by decreasing solitude and wildlife populations. Hunting and fishing use would probably increase, since these sports are popular with Colstrip residents. Residents also fear that game poaching may increase and that bars would become a social focus, resulting in alcoholism, fighting, and family turmoil.

Reduced access to the national forest is a concern of the U.S. Forest Service. Ranchers now control about 90 percent of the access to the Ashland Division of the Custer National Forest; if the ranchers view recreationists as a threat, they could deny access across their property. This would reduce the amount of forest land easily accessible to both recreationists and Forest Service personnel. Use of the forest would probably increase but not approach capacity, except during hunting season, when capacity would be exceeded.

Facilities Shortages

The following facilities would be needed during mine operation to meet minimum standards for developed facilities in Ashland: a wading pool, a tennis court, a ballfield, a playground, and a 1.2-acre neighborhood park. The only additional need in the cumulative scenario would be an increase in the size of the park by 0.8 acre. (Mountain West Research, Inc., [MWRI], 1981, p. 7-61).

The recreation facilities and park acreage at Colstrip are projected in the long term to be more than adequate whether the Montco Mine alone is built or the cumulative scenario takes place. However, in the construction years of 1982 and 1986, Colstrip would experience a temporary but significant increase in demand for all recreation facilities and services. Crowded conditions and possible site degredation may occur from overuse, if temporary facilities or other use areas are not constructed (MWRI, 1981, p. 7-84).

Mitigating Measures

Newcomers unfamiliar with the area may, during their recreational activities, create conflicts with long-time residents. Conflicts could be reduced if a public relations program based on information from local landowners, the Northern Cheyenne, and the Forest Service were established. The program could provide information on (1) land ownership, (2) how to gain access to the national forest and private land, (3) hunting, fishing, and other recreation ordinances on the reservation, and (4) areas of the national forest best suited for particular uses.

Other measures could also be taken: (1) indoor and outdoor recreation facilities could be built in communities where workers locate, (2) the dedication of mandatory park land dedication in new subdivisions could be encouraged, (3) "adopt-a-park" or other park promotion activities could be established, and (4) outdoor recreation activities and areas for workers could be identified. (For more detail on these last four actions, see the 1981 report by Mountain West Research, Inc.)

CULTURAL RESOURCES

Summary of Impacts: Eleven prehistoric cultural sites eligible for listing in the National Register of Historic Places would be destroyed by the Montco Mine; however, all would be excavated, recorded, and analyzed prior to mining.

Thirty-nine of the 62 cultural sites found during the inventory work done for the Montco Mine are not judged eligible for listing on the National Register of Historic Places.

Of the 22 sites judged to be eligible for listing in the National Register, 11, all prehistoric properties, would be lost in the course of mining. These 11 are valuable for their potential to provide information important to understanding Montana's prehistory. The degree of loss sustained by these sites will be lessened through collection of some of the information within the sites prior to mining.

Another prehistoric site, a buffalo jump, is relatively complex in terms of the amount and deposition of cultural materials. Impacts on the site from mining seem unlikely; however, loss from vandalism, pothunting, and possibly blasting could be high.

The six remaining eligible prehistoric properties would not be affected by mining.

Of the four historic sites eligible for National Register listing, three do not lie within the proposed mining area but are situated immediately adjacent to it. These include abandoned buildings from former homesteads. Their deterioration may accelerate from vandalism, theft, arson, or possibly blasting resulting from development of the mine. The fourth historic site would not be affected by permit area mining; however, it falls within the mine plan area. A fifth site, which may be eligible, is located on the Northern Cheyenne Reservation and would not be affected by mining.

To mitigate the destruction of 11 prehistoric sites, Montco has submitted and had approved a mitigation plan that is now part of their mine application. Before mining, Montco would collect the kinds of information from the sites most needed in answering questions about prehistoric activities. This would require excavation, recording, and analysis of the sites' artifacts.

One additional prehistoric site and four historic properties may suffer loss from vandalism, collecting, and blasting. To mitigate these impacts, Montco would (1) commit to taking no action that would encourage accelerated deterioration, (2) record cultural data on the historic buildings, features, and sites, using maps, drawings, photographs, and analysis, and (3) for the prehistoric site, whose informational value is extensive, include inspection of the condition of the site in DSL quarterly mine inspections.

AESTHETICS

> Summary of Impacts: The Montco Mine would replace the pastoral landscape of the mine plan area with an industrial setting.

The greatest impact on aesthetic qualities for the duration of mining would be the marked change from a rural to an industrial setting. Some mining activity, the facilities, and railroad would be visible from the Ashland-Birney gravel road; the majority of persons traveling that road would be mine employees.

Odors from vehicle emissions would partially replace natural odors, predominantly the smell of vegetation. Sounds originating from mining activities--haul trucks, trains, drilling, blasting, conveyors, and crushers--would pervade the formerly quiet rural area.

During the last six years of mining in the South Gate mining unit, the residents of Birney Day Village would be exposed to these changes in sites, sounds, and smells.

Following cessation of mining, assuming reclamation is successful, the area would be returned to a natural state similar to its premining appearance.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

During the proposed 24-year life of the Montco Mine, 186.1 million tons of coal would be recovered; 27.8 million tons of coal would not be recovered, owing to the limitations of present technology.

The mine, according to Montco's original proposal, would use an average of roughly 410 acre-feet of water per year. A majority of this water would be lost to evaporation and therefore would not be available for other uses downstream, such as agriculture. The population growth associated with the mine would require about 240 acre-feet per year on the average.

The ground water that passes through the mine spoil would, for at least several thousand years after mining, be of poorer quality than existed prior to mining. One spring, the McKelvey, is anticipated to go dry. It may or may not resume flow when the postmining ground water system is reestablished. However, other sources of ground and surface water sources are available that can be used for stock watering and the like. In addition, Montco would be required by law to replace any wells removed or severely affected by mining. Slightly more electricity would probably be needed to pump the ground water from deeper depths; the cost of this would probably be borne by the postmining land user.

The landscape of the Montco Mine would be modified during mining, but the final landscape would approximate the premining contours. Over the course of several decades, the mining area would be obvious as a postmining landscape. Over thousands of years, however, the postmining landscape would blend with the surrounding countryside.

The approximately 5,500 acres that would be disturbed by mining are now used primarily for livestock grazing. Ranchers would not be able to use these lands during mining.

The 800 acres of land used for new housing developments would be permanently removed from agricultural and wildlife uses. In addition, the proposed Tongue River Railroad mainline would remove from production 2,824 acres of land now used primarily for agriculture.

Based on current accident rates and projected traffic volumes, about 300 additional traffic accidents would occur during the cumulative scenario, resulting in 5 more deaths and 144 more injuries than would occur without any new mining in the area. (In the cumulative scenario, four mines and one railroad line with two terminal points would be built in addition to the Montco Mine.) In addition, at the Montco Mine, mining and construction would cause about 330 accidents over the life of the mine.

Eleven prehistoric cultural sites eligible for the National Register of Historic Places would be destroyed during mining; however, all of these sites would be excavated, recorded, and analyzed prior to mining and thus their information would not be irretrievably lost. Four additional sites, three historic and one prehistoric, could be irreversibly damaged by indirect effects of mining, such as vandalism, amateur collecting, and blasting.

SHORT-TERM USES VERSUS THE PRODUCTIVITY OF THE HUMAN ENVIRONMENT AFTER MINING

Coal from the Montco Mine would produce electricity and considerable tax revenues, royalties, and jobs. This would be achieved at a cost of short-term vegetative, wildlife, and livestock productivity at and near the minesite.

Reductions in long-term productivity would be minimal. Maximum potential vegetative productivity of the reclaimed lands would probably not be as high after mining as what could have been achieved prior to mining under optimum management. The slight reduction in potential productivity that would occur could last for several decades, caused by the unavoidable impacts on soils, such as loss of structure, soil profile, pore continuity, and soil microorganisms, and a reduction in organic matter concentration. Trees also would take a relatively long period of time to reestablish.

The coal produced from the mine would be burned for electrical power. The company has focused its marketing efforts on the upper Midwest and the Pacific Northwest.

During the life of the mine, the airshed over the mining area would serve as a temporary depository for air pollutants, both particulate and gaseous. After the end of mining and reclamation, assuming successful revegetation, the air quality would return to its premining condition.

From 1987 through 2007 the Montco Mine would pay a total of about $418.7 million in state severence taxes, about $10 million in local coal taxes, $102 million in Federal coal taxes, and about $100 million in state royalties. In addition, increased revenues from property taxes would make it easier for local school districts and Rosebud County to finance their operations.

The mine would cause severe revenue shortfalls in Powder River County. Rosebud County would become more dependent on coal mining, subjecting the tax base to increasing risk of major fluctuations from unforeseen changes in mine production. The mine would also continue to change the employment structure of Rosebud County and begin a change from a rural and agricultural society to a more urban and industrial society; this change would last as long as mining continues in the area.

Chapter IV

APPENDIXES

Species for Revegetation on the Montco Area -- Appendix 1
Avian Species Observed on the Montco Wildlife Study Area -- Appendix 2
Mammalian Species Observed on the Montco Wildlife Study Area -- Appendix 3
Reptiles and Amphibians on the Montco Wildlife Study Area -- Appendix 4
Estimates of Increased of Total Dissolved Solids in Tongue River -- Appendix 5
Overview of the Economic-Demographic-Fiscal Modeling -- Appendix 6
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Accuracy of Montco Overburden Data -- Appendix 8
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Densities of Big Sagebrush, Ponderosa Pine, and Juniper -- Appendix 10

APPENDIX 1

Species for Revegetation on the Montco Permit Area

Species	Preferred Variety	Primary Locations On Site	Soil Adaptation	Tolerance to Salinity/ Alkalinity	Wildlife Value	Palatability to Cattle	Method of Establishment	Area of Establishment**
GRASSES								
Big bluegrass (Poa ampla)	Sherman	Not common	Best on medium	Poor to fair	Minor food and cover	Good	Seed	2,4
Blue grama (Bouteloua gracilis)	Lovington	Uplands; clay-silty loams	All; best on medium to fine	Poor to fair	Minor food and cover	Good	Seed	2,4
Beardless wheatgrass (Agropyron inerme)	Whitmar	Not Present	Best on medium to fine	Poor to fair	Minor food and cover	Good	Seed	1,2,3
Buffalograss (Buchloe dactyloides)	--	Not present	Best on medium to clayey	Poor to fair	Moderate food; minor cover	Good	Seed	1,2,3,4
Green needlegrass (Stipa viridula)	Lodorm	Upland drainages; clay-silt loams	Best on medium to fine	Poor to fair	Minor food and cover	Good	Seed	1,2,4
Indian ricegrass (Oryzopsis hymenoides)	Paloma	Badlands, slopes; coarse, stoney soils	Best on sandy to medium	Poor to fair	Moderate food; minor cover	Good	Seed	3
Little bluestem (Schizachyrium scoparius)	Adlous, Blaze	Slopes; coarse soils	All; best on sandy to medium	Poor	Minor food and cover	Fair	Seed	3
Needle-and-thread (Stipa comata)	--	Uplands, slopes; coarse soils	Best on sandy to medium	Poor to fair	Minor food and cover	Good	Seed	3
Prairie sandreed (Calamovilfa longifolia)	Goshen	Sidehills, breaks; coarse	All; best on sandy to medium	Poor	Moderate food; minor cover	Fair	Seed	3
*Sideoats grama (Bouteloua curtipendula)	Vaughn, Pierre	Slopes; coarse soils	All; best on sandy to medium	Poor to fair	Minor food and cover	Good	Seed	1,2,3,4
Slender wheatgrass (Agropyron trachycaulum)	Primar	Not present	All; best on medium to fine	Fair to good	Minor food and cover	Good	Seed	S
Streambank wheatgrass (Agropyron riparium)	Sodar	Not present	All; best on medium	Fair to good	Minor food and cover	Good	Seed	2,4,5,S

Species For Revegetation on the Montco Permit Area
(Continued)

Species	Preferred Variety	Primary Locations On Site	Soil Adaptation	Tolerance to Salinity/ Alkalinity	Wildlife Value	Palatability To Cattle	Method of Establishment	Area of Establishment**
Thickspike wheatgrass (*Agropyron dasystachyum*)	Critana	Uplands; clay-silt loams	Best on medium to fine	Fair to good	Minor food and cover	Good	Seed	1,2,3,4,5,S
Western wheatgrass (*Agropyron smithii*)	Rosana	Uplands, drainages, slopes; clay-silt loams, coarse soils	Best on medium to fine	Good	Minor food and cover	Good	Seed	1,2,4,5,S
FORBS								
Arrowleaf balsamroot (*Balsamorhiza sagittata*)	--	Slopes; coarse soils	Best on medium	Poor	High food; moderate cover	Fair	Seed	1
Cicer milkvetch (*Astragalus cicer*)	Lutana	Not present	All; best on medium to clayey	Fair	High food; minor cover	Good	Seed	2,3,4
Fringed sagewort (*Artemisia frigida*)	--	Uplands, slopes; coarse soils	All; best on medium	Poor	Moderate food; moderate cover	Poor	Seed	1,2,4
Lewis flax (*Linum lewisii*)	--	Widely distributed; variable soils	Best on medium	Poor	Moderate food; minor cover	Fair	Seed	1,3
Purple prairie clover (*Petalostemon purpureum*)	--	Uplands, slopes; coarse soils	All; best on shallow soils	Poor	High food; minor cover	Fair	Seed	1,3
Scarlet globemallow (*Sphaeralcea coccinea*)	--	Lowlands; clayey soils	All	Fair	Moderate food; minor cover	Fair	Seed	2,4
Yarrow (*Achillea millifolium*)	--	Slopes; coarse soils, silt loams	All; best on sandy and medium	Poor	High food; minor cover	Poor	Seed	1,3
SHRUBS/TREES								
Big sagebrush (*Artemisia tridentata*)	--	Uplands, badlands, clay-silt loams, coarse loams	Coarse to fine	Fair	Moderate food; high cover	Fair to Poor	Seed, Seedlings	1,2,4
Buffaloberry (*Sheperdia argentea*)	--	Drainageways	All; best on medium	Poor	High food and cover	Poor	Seedlings	5

Species for Revegetation on the Montco Permit Area

(Continued)

Species	Preferred Variety	Primary Locations On Site	Soil Adaptation	Tolerance to Salinity/ Alkalinity	Wildlife Value	Palatability To Cattle	Method of Establishment	Area of Establishment**
Chokecherry (Prunus virginiana)	--	Drainageways	All; best on medium	Poor	High food and cover	Poor	Seedlings	5
Common snowberry (Symphoricarpos albus)	--	Drainageways	Best on medium	Poor	High food and cover	Fair	Seedlings	5
Common winterfat (Ceratoides lanata)	--	Uplands; clay-silt loams	All; best on medium to fine	Good	High food; minor cover	Fair	Seed	4
Fourwing saltbush (Artiplex canescens)	Wytana	Uplands	Coarse to medium	Good	High food; high cover	Fair	Seed, Seedlings	2,3
Ponderosa pine (Pinus ponderosa)	--	Slopes; very coarse soils, silt loams	All	Fair	Minor food; high cover	Poor	Seed, Seedlings transplants	1
Rocky Mountain juniper (Juniperus scopulorum)	--	Badlands, slopes; very coarse soils, silt loams	All best on medium to sandy	Fair to Good	Moderate food; high cover	Poor	Seed, Seedlings, transplants	1,5
Rubber Rabbitbrush (Chrysothamnus nauseosus)	--	Uplands, slopes, badlands	Coarse to medium	Fair	Moderate food; moderate cover	Poor	Seed	1
Silver sagebrush (Artemisia cana)	--	Lowland, stream courses	All, best on medium	Poor	Moderate food; high cover	Fair	Seedlings	5
Skunkbush sumac (Rhus trilobata)	--	Slopes, coarse soils	Coarse to medium	Poor	Moderate food; high cover	Poor	Seedlings	1,3,5
Woods Rose (Rosa woodsii)	--	Lowlands, coulees	Best on sandy to medium	Poor	High food; high cover	Fair	Seedlings	3,5

**Postmining areas:
1 = ponderosa pine/juniper
2 = big sagebrush/grassland
3 = sidehill bunchgrass
4 = sod-forming grassland
5 = drainageways
S = soil stockpile

APPENDIX 2

Avian Species Observed on the Montco Wildlife Study Area, July, 1978-November, 1982

Common Name	Scientific Name
eared grebe	*Podiceps nigricollis*
double-crested cormorant	*Phalacrocorax auritus*
great blue heron	*Ardea herodias*
snowy egret	*Leucophoyx thula*
Canada goose	*Branta canadensis*
mallard	*Anas platrhynchos*
gadwall	*Anas strepera*
pintail	*Anas acuta*
green-winged teal	*Anas crecca*
blue-winged teal	*Anas discors*
American widgeon	*Anas americana*
northern shoveler	*Anas clypeata*
wood duck	*Aix sponsa*
redhead	*Aythya amoricana*
ring-necked duck	*Aythya collaris*
lesser scaup	*Aythya affinis*
common goldeneye	*Bucephala clangula*
bufflehead	*Burcephala albeola*
hooded merganser	*Lophodytes cucullatus*
common merganser	*Mergus merganser*
turkey vulture	*Cathartes aura*
goshawk	*Accipter gentilis*
sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
red-tailed hawk	*Buteo jamaicensis*
Swainson's hawk	*Buteo swainsoni*
rough-legged hawk	*Buteo lagopus*
ferruginous hawk	*Buteo regalis*
golden eagle	*Aquila chrysaetos*
bald eagle	*Haliaeetus leucocephalus*
marsh hawk	*Circus cyaneus*
osprey	*Pandion haliaetus*
gyrfalcon	*Falco rusticolus*
prairie falcon	*Falco mexicanus*
peregrine falcon	*Falco peregrinus*
merlin	*Falco columbarius*
American kestrel	*Falco sparverius*
sharp-tailed grouse	*Pediocectes phasianellus*
sage grouse	*Centrocercus urophasianus*
ring-necked pheasant	*Phasianus colchicus*

Avian Species Observed on the Montco Wildlife Study Area, July, 1978-November, 1982 (Continued)

Common Name	Scientific Name
gray partridge	*Perdix perdix*
Merriam's turkey	*Meleagris gallopavo*
sandhill crane	*Gus canadensis*
sora	*Porzana carolina*
killdeer	*Charadrius vociferus*
common snipe	*Capella gallinago*
upland sandpiper	*Bartramia longicauda*
spotted sandpiper	*Actitis macularia*
solitary sandpiper	*Tringa solitaria*
willet	*Catoptrophorus semipalmatus*
greater yellowlegs	*Totanus melanoleucus*
western sandpiper	*Ereunetes mauri*
American avocet	*Recurvirostra americana*
Wilson's phalarope	*Steganopus tricolor*
ring-billed gull	*Larus delawarensis*
Franklin's gull	*Larus pipixcan*
mourning dove	*Zenaidura macroura*
black-billed cuckoo	*Coccyzus erythropthalmus*
screech owl	*Otus asio*
great horned owl	*Bubo virginianus*
burrowing owl	*Speotyto cunicularia*
short-eared owl	*Asio flammeus*
poor-will	*Phalaneoptilus nuttallii*
common nighthawk	*Chordeiles minor*
chimney swift	*Chaetura pelagica*
white-throated swift	*Aeronautes saxatalis*
belted kingfisher	*Megaceryle alcyon*
common flicker	*Colaptes auratus*
red-headed woodpecker	*Melanerpes erythrocephalus*
yellow-bellied sapsucker	*Sphyrapicus varius*
hairy woodpecker	*Dendrocopos villosus*
downy woodpecker	*Dendrocopos pubescens*
Eastern kingbird	*Tyrannus tyrannus*
Western kingbird	*Tyrannus verticalis*
Say's phoebe	*Sayornis saya*
least flycatcher	*Empidonax minimus*
Western wood pewee	*Contopus sordidulus*
horned lark	*Eremophila alpestris*
violet-green swallow	*Tachycineta thalassina*

Avian Species Observed on the Montco Wildife Study Area, July, 1978-November, 1982 (Continued)

Common Name	Scientific Name
tree swallow	*Tridoprocne bicolor*
bank swallow	*Riparia riparia*
rough-winged swallow	*Stelgidopteryx ruficollis*
barn swallow	*Hirundo rustica*
cliff swallow	*Petrochelidon pyrrhonota*
black-billed magpie	*Pica pica*
common crow	*Corvus brachyrhynchos*
pinyon jay	*Gymnorhinus cyanocephala*
black-capped chickadee	*Parus articapillus*
white-breasted nuthatch	*Sitta carolinesis*
red-breasted nuthatch	*Sitta canadensis*
house wren	*Troglodytes aedon*
cannon wren	*Catherpes mexicanus*
rock wren	*Salpinctes obsoletus*
gray catbird	*Dumetella carolinesis*
brown thrasher	*Toxostoma rufum*
sage thrasher	*Oreoscoptes montanus*
American robin	*Turdus migratorius*
veery	*Hylocichla fusecens*
Western bluebird	*Sialia mexicana*
mountain bluebird	*Sialia currucoides*
Townsend's solitaire	*Myadestes townsendi*
water pipit	*Motacilla spinoletta*
Bohemian waxwing	*Bombycilla gerrula*
cedar waxwing	*Bombycilla cedrorum*
Northern shrike	*Lanius excubitor*
loggerhead shrike	*Lanius ludovicianus*
starling	*Sturnus vulgaris*
solitary vireo	*Vireo solitarius*
red-eyed vireo	*Vireo olivaceus*
yellow warbler	*Dendroica coronata*
common yellowthroat	*Geothlypis trichas*
yellow-breasted chat	*Icteria virens*
American redstart	*Setophaga ruticilla*
house sparrow	*Passer domesticus*
Western meadowlark	*Sturnella neglecta*
yellow-headed blackbird	*Xanthocephalus xanthocephalus*
red-winged blackbird	*Agelaius phoeniceus*
Northern oriole	*Iceterus galbula*

Avian Species Observed on the Montco Wildife Study Area, July, 1978-November, 1982 (Continued)

Common Name	Scientific Name
Brewer's blackbird	*Euphagus cyanocephalus*
common grackle	*Quiscalus guiscula*
brown-headed cowbird	*Molothrus ater*
black-headed grosbeak	*Phecuticus melanocephalus*
Lazuli bunting	*Passerina amoena*
evening grosbeak	*Hesperiphona vespertina*
gray-crowned rosy finch	*Leucosticte tephrocotis*
common redpoll	*Acanthis flammea*
pine siskin	*Spinus pinus*
American goldfinch	*Spinus tristis*
rufus-sided towhee	*Pipilo erythrophthlamus*
lark bunting	*Calamospiza melanocorys*
Savannah sparrow	*Passerculus sandwichensis*
grasshopper sparrow	*Ammodramus savannarum*
vesper sparrow	*Pooecates gramineus*
lark sparrow	*Chondestes grammacus*
dark-eyed junco	*Junco hyemalis*
tree sparrow	*Spizella arborea*
chipping sparrow	*Spizella passerina*
Brewer's sparrow	*Spizella breweri*
white-crowned sparrow	*Zonotrichia leucophrys*
fox sparrow	*Passerella iliaca*
song sparrow	*Melospiza melodia*
yellow-rumped warbler	*Dendroica coronata*
red crossbill	*Loxia curvirostra*
warbling vireo	*Vireo gilvas*
American coot	*Fulica americana*
ruddy duck	*Qxyura jamaicensis*
rock dove	*Columba livia*
long-eared owl	*Asio otus*
Clark's nutcracker	*Nucifraga columbiana*
brown creeper	*Certhia familiaris*
golden-crowned kinglet	*Regulus satrapa*
ovenbird	*Seiurus aurocapillus*
pine grossbeak	*Punicola enucleator*
snow bunting	*Plectrophenax nivalis*
least sandpiper	*Erolia minutilla*

APPENDIX 3

Mammalian Species Observed on the Montco Wildlife Study Area, July, 1978-August, 1979

Common Name	Scientific Name
masked shrew	Sorex cinereus
little brown myotis	Myotis lucifugus
white-tailed jackrabbit	Lepus townsendii
desert cottontail	Sylvilagus auduboni
thirteen-lined ground squirrel	Spermophilus tridecemlineatus
black-tailed prairie dog	Cynomys ludovicianus
least chipmunk	Eutamias minimus
red squirrel	Tamiasciurus hudsonicus
northern pocket gopher	Thomomys talpoides
olive-backed pocket mouse	Perognathus fasciatus
ord kangaroo rat	Dipolomys ordii
beaver	Castor canadensis
Western harvest mouse	Reithrodonotomys megalotis
deer mouse	Peromyscus maniculatus
white-footed mouse	Peromyscus leucopus
bushy-tailed wood rat	Neotoma cinerea
meadow vole	Microtus pennsylvanicus
prairie vole	Microtus ochrogaster
sagebrush vole	Lagurus curtatus
muskrat	Ondatra zibethicas
meadow jumping mouse	Zapus hudsonius
house mouse	Mus musculus
porcupine	Erethizon dorsatum
long-tailed weasel	Mustela frenata
mink	Mustela vison
striped skunk	Mephites mephites
badger	Taxidea taxus
raccoon	Procyon lator
red fox	Vulpes vulpes
coyote	Canis latrans
bobcat	Lynx rufus
white-tailed deer	Odocoileus virginianus
mule deer	Odocoileus hemionus
pronghorn	Antilocapra americana

APPENDIX 4

Reptiles and Amphibians Observed on the Montco Wildlife Study Area, July, 1978-August, 1979

Common Name	Scientific Name
reptiles	
snapping turtle	Chelydra serpentina
spring softshell	Trionyx spiniferus
sagebrush lizard	Sceloporus graciosus
racer	Coluber constrictor
gopher snake	Pituophis melanoleucus
plains garter snake	Thamnophis radix
Western rattlesnake	Crotalus viridis
Amphibians	
tiger salamander	Ambystoma tigrinum
woodhouse's toad	Rufo woodhousei
chorus frog	Pseudacris triseriata
leopard frog	Rana pipiens

APPENDIX 5

Estimates of Increased Concentrations of Total Dissolved Solids in Tongue River Channel Flow Due to Surface Coal Mining at the Montco Mine

Several quantitative techniques were utilized to estimate postmining increases in Tongue River dissolved solids loads that would result from mining both the North King mining unit and entire 24-year mine plan area. These estimates are described below.

(1) Montco submitted in its permit application (Volume 5, Chapter V) an estimate of the dilution effect Tongue River streamflow and alluvial groundwater would have on postmining spoils ground water as the latter moves toward the Tongue River, under the North King mining unit.

Montco used a calculated postmining ground water flow rate through spoils of 0.004 cfs and an assumed postmining spoils dissolved solids concentration (TDS) of 10,000 mg/l. It is notable that the assumed spoils TDS concentration is markedly greater than any value reported to date in southeastern Montana.

Predicted postmining ground water flow from the resaturated pit toward the Tongue River would result in the degraded spoils water discharging to Tongue River alluvium. Montco postulated a mixing of this degraded ground water with Tongue River alluvial ground water with a mean TDS concentration of 1215 mg/l and a calculated alluvial ground water flow rate of 0.78 cfs.

Tongue River alluvial ground water was then postulated to mix with a measured low streamflow of the Tongue River of 179 cfs and a TDS concentration of 814 mg/l. Montco's derivation of the assumed Tongue River flow rate and TDS concentration are provided in the permit application (p. V-2-58). They are reasonable.

The result of Montco's analysis indicates that dilution of degraded spoils ground water as it moves to the Tongue River would result, after assumed complete mixing, in TDS concentrations increasing by 0.01 percent.

Montco's analysis is subject to several theoretical objections; nonetheless, it provides an approximation of TDS increases due to mining by Montco, which is at least one approach to an issue of concern.

502 acres would be mined by Montco under the North King mining unit, whereas 5,322 acres will be mined in the entire 24-year life of the mine. The ratio of the latter to the former is 10.6. If increased TDS loads in the Tongue River resulting from the 24-year mine plan of operations is assumed to be proportional, TDS increases in Tongue River low flow would approximate 0.1 percent.

(2) An additional approach to the problem yields a similar result. Utilization of a quantitative predictive model developed and described by Woods (1981) provides an opportunity to assess potential dissolved solids increases

in the Tongue River due to mining by Montco. The reader is referred to the original publication (Woods, 1981) for details of the model.

Woods' model (1981) makes allowances for contributions to Tongue River channel flow from gaged and ungaged tributaries, as well as for streamflow lost to or gained from ice and irrigation withdrawals and returns. These factors were excluded from the present analysis.

Factors considered are channel flow, ground water contributions to channel flow, evaporation, and precipitation. Only the month of August is analyzed because this is historically the period of lowest, irrigation-season channel flow and when water quality is consequently of greatest concern.

Tongue River channel flow is assumed to be 100 cfs, or about 6,200 acre-feet (AF) for the month of August. Evaporation is assumed to be 0.425 acre feet per acre (AF/A), the historic maximum, and precipitation is assumed to be 0.001 AF/A, the historic minimum (Woods, 1981, Table 7). Ground water inflow to the channel was calculated from Montco's data to be about 0.01 cfs, or 0.62 AF per mile per side of channel per month.

Dissolved solids concentrations input to the model are 800 mg/l for streamflow, 3500 mg/l for ground water contributions unaffected by mining, and 10,000 mg/l for ground water contributions affected by mining.

Putting these values into the equation under conditions for the North King mining unit, and accepting approximately one mile of stream reach as gaining from spoils ground water, dissolved solids concentrations in Tongue River streamflow increase from an assumed 800 mg/l to about 803 mg/l, (0.3%).

Using the same input values as above and assuming approximately 10.7 miles as the affected Tongue River reach gaining degraded spoils ground water, dissolved solids concentrations increase from an assumed 800 mg/l to about 827 mg/l, (3.0%).

The above analysis is simplistic yet suggests that mining by Montco under both the North King mining unit and 24-year plans would have no measurable effect on Tongue River water quality. The analysis was made using warm season, low-flow criteria and assumes additional worst-case inputs. Impacts at other times of the year would be even less measurable due to increased channel flow and a greater dilution effect. However, as improvements and advancements in science are made, and as Montco provides greater details of future mining plans, the above estimates should be reevaluated.

APPENDIX 6

Overview of the Economic-Demographic-Fiscal Modeling

The economic-demographic-fiscal model of Mountain West Research, Inc., was selected for use in the Montco EIS following a review of the available models. The selection was based on the firm's experience in the area, the comprehensiveness of the model, and the model's extensive application to a wide variety of projects. Subsequent to the selection, an independent critical evaluation of socioeconomic forecasting methodologies prepared for the U.S. Geological Survey (1981) concluded that the model "is one of the more sensible and comprehensive impact assessment models. Its strong points include the consideration of hierarchical trading linkages, the detailed labor market module, and the calibrated allocation equations for nonlocal construction workers."

A complete description of the model and methodologies used in the Mountain West Research, Inc., technical report (MWRI, 1981) is contained in Chapter 2 of the report, on file at the Department of State Lands office in Helena. The general flow of information in the model is depicted in figure IV-1. The following is an abbreviated summary.

The model is made up of a set of submodels:

(1) Demographic submodel. This submodel keeps track of population characteristics, such as births and deaths, and the age/gender composition of an area. The supply of labor is determined from labor force participation rates and the "survived" population.

(2) Economic submodel. This submodel determines labor demand, using an economic base approach to estimate total employment.

(3) Labor market submodel. This reconciles model estimates of labor supply and labor demand. Labor market imbalances trigger either in- or out-migration from the area. The submodel process results in internally consistent levels of population, employment, and income for the area.

(4) Construction worker submodel. This determines the geographic source (local/nonlocal) and the residential choice of construction and operational workers.

(5) Community allocations submodel. This produces population estimates for individual communities.

(6) Project management submodel. This organizes project-related and other user-supplied information that form the alternative scenarios to be evaluated.

(7) Fiscal submodel. This uses projections from the community allocations and project management submodels to identify potential problem areas. The fiscal submodel does this by comparing the costs of providing the projected facilities and services with the projected revenues.

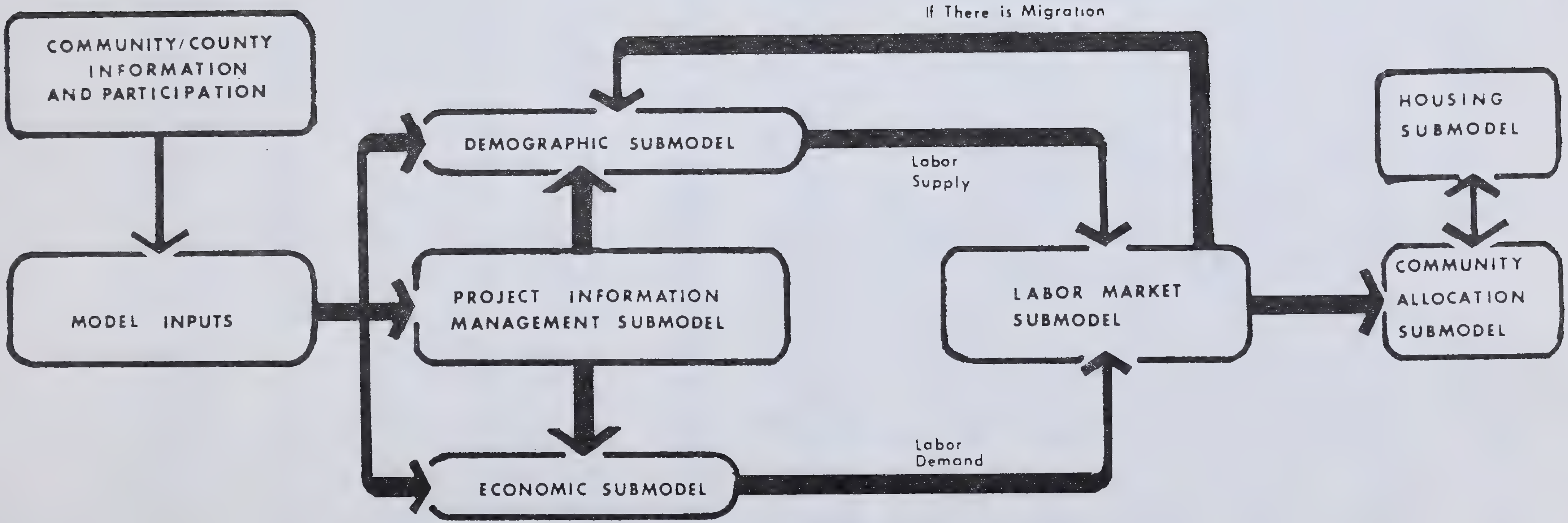


FIGURE IV-1

Overview of the Mountain West Research, Inc., Economic/Demographic Assessment Model

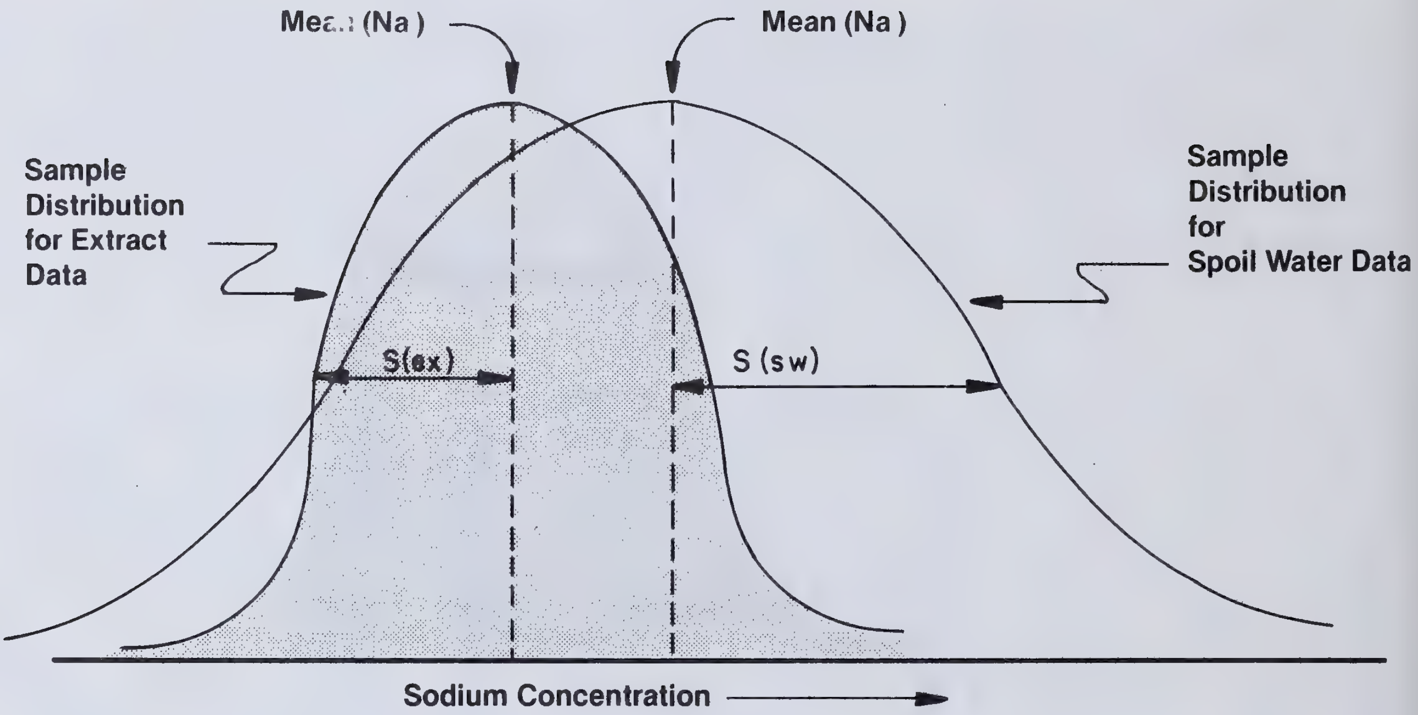
APPENDIX 7

Summary of Several Methods of Predicting Spoil Water Quality from Overburden Extract Data

Three simplified, yet adequate, methods have been devised for predicting postmining spoil water quality. These techniques were developed using the chemical characteristics of overburden-paste extracts and existing spoil water quality at sites where both sets of data exist. A basic assumption necessary for this approach is that the overburden extract chemistry is an indicator of spoil water quality. Statistical relationships were therefore investigated to compare extract and spoil water quality. Development of a quantitative relationship between spoil water quality and overburden extract is dependent on a common entity.

Van Voast et al. (1978) have developed comparisons between saturated-paste extracts and spoil water quality for two locations, the Decker and Big Sky Mines. In this technique, location was the common entity. A further assumption made was that linear relationships exist between the locations. The technique is primarily graphical. From the nomographs developed by Van Voast et al. (1978), ranges of probable lognormal mean concentrations of calcium, magnesium, and sodium can be predicted for spoil waters in proposed mine areas where only saturated-paste-extract data are available. This is accomplished by comparing upper and lower 95% confidence limits for saturated-paste extract concentrations of the above ions for the proposed mine to graphs in Van Voast et al. (1978). The graphs in the latter are the upper and lower 95% confidence limits for the ion concentrations in saturated-paste extract versus spoil waters at the Decker and Big Sky Mines.

Two new techniques were developed by Systems Technology (1982). One uses location as the common entity between saturated-paste-extract chemistry and spoil water quality, whereas the other uses specific conductance (SC). The first technique developed by Systems Technology is called the "means and variances" technique. In this technique, the means and variances of the saturated-paste-extract water quality and spoil water quality data sets are compared at each of three mine areas: Big Sky, Colstrip, and Decker. The ratios of the means ($\bar{X}(sw)/\bar{X}(ex)$) and variances ($S^2(sx)/S^2(ex)$) between spoil water chemical parameters and extract chemical parameters were determined for each of the mine areas. Thus, these ratios can be used to predict the mean and variance of spoil water at a proposed mine when only saturated-paste extract chemical data are available, provided the extract chemistry is simlar to the extract chemistry at one of the above mines. A comparison between saturated-paste-extract chemistry at the locations was made using a t-test for the means. The t-test analysis, for example, indicated statistical differences between the means of sodium concentrations for Big Sky, Colstrip, and Decker. When compared, the various Montco mining units appear to be more similar to Decker than to Big Sky or to Colstrip. The relationship between extract and spoil water at the Decker location was used to predict sodium concentrations in spoil water for the Montco area. Figure A7-1 is an example of this method.


Mean (Na)
Mean (Na)
Sample Distribution for Extract Data
Sample Distribution for Spoil Water Data
S(ex)
S (sw)
Sodium Concentration

SCHEMATIC DIAGRAM

Decker

Ratio of sodium means = $X(sw)/X(ex) = 1.41$
Ratio of sodium variances = $S^2(sw)/S^2(ex) = 8.98$

Montco

Mean sodium for North King overburden (40 feet above coal) = 30.31 meq/l
Variance of Sodium for North King overburden (40 feet above coal) = 262

Est. mean sodium of North King spoil water = 30.31 (1.41) = 42.7 meq/l
Est. variance of sodium for North King spoil water = 262 (8.98) = 2,357 $(\text{meq/l})^2$

FIGURE A7-1

Graphical Explanation of Mean & Variance Method

In the "linear regression" technique, the independent variable of similar regression analyses was used as the common entity. Good linear regressions exist for sodium versus specific conductance in both the extract and spoil water. The cation versus specific conductance relationships for the extract of a location whose spoil water quality is to be estimated is compared to similar relationships at one of the three known locations. The comparison of extract relationships at the various locations can be based on a t-test analysis of means or slopes of the regressions equations. When using the slopes as a guide, the intercept values (i.e. the regression constants) should be small (about zero). As with the "mean and variance" technique, the various Montco units resemble Decker more than the Big Sky or Colstrip mines. The equation for sodium in spoil water at Decker was derived by substitution. The equation for sodium in extract water illustrated in figure A7-2, was first solved for SC, then substituted into the equation for sodium in spoil water. Thus, the resulting equation describes the relative increase of sodium in spoil water expected for a given mean SC.

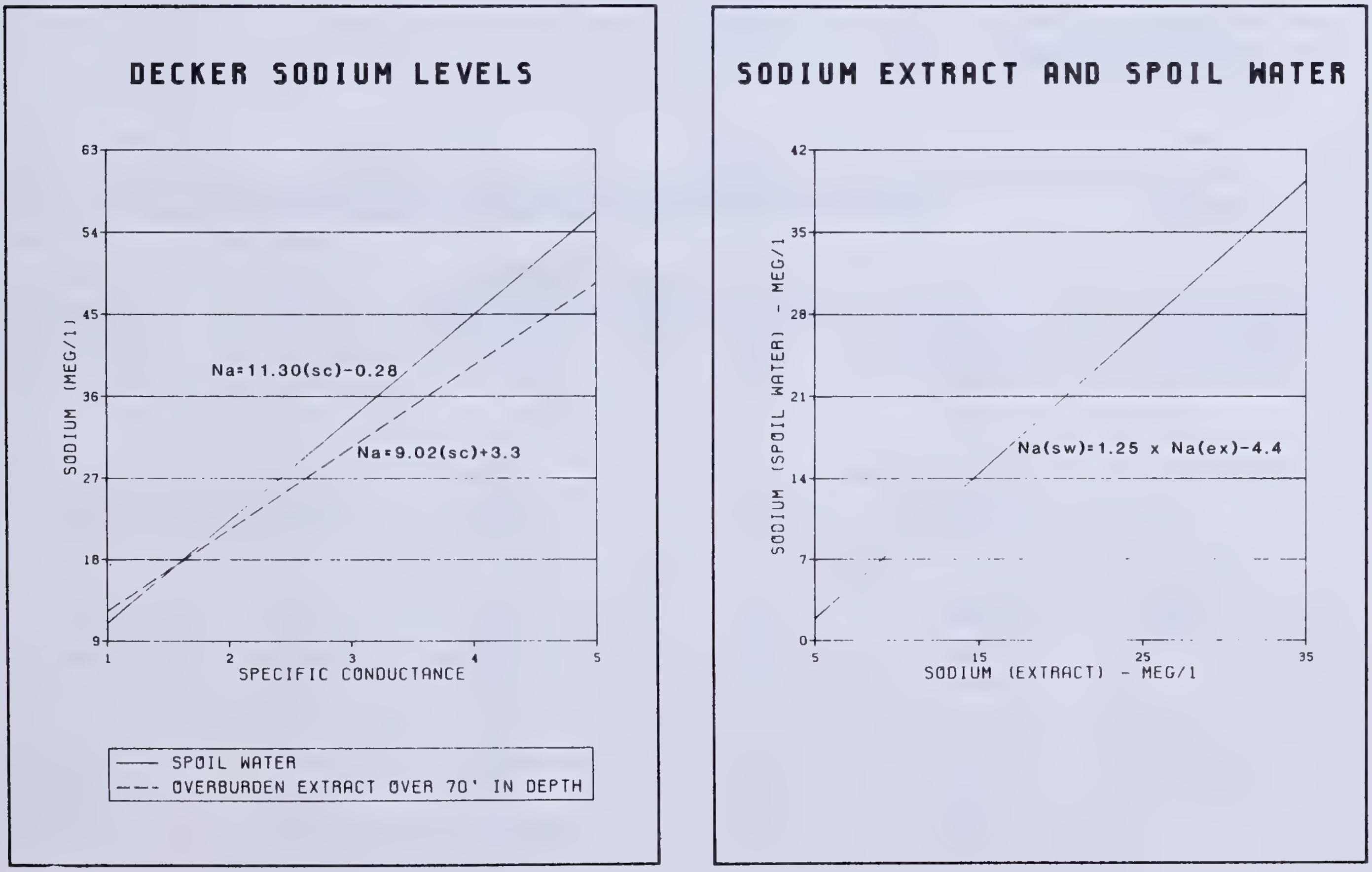


FIGURE A7-2

Sodium in Spoil and Extract Water

The Van Voast et al (1978) and "mean and variances" methods indicate (measure) the shift in the magnitude of the concentration from extract to spoil water. The linear regression technique, however, indicates only a shift in the relative proportions of the cations. The results of the application of these techniques are shown in tables A7-1 and A7-2. Predictions of spoil water sodium concentrations were made using all three of the techniques. Agreement between the methods is generally good. The range of mean sodium concentrations for all mine units, using the "means and variances" method, is from 38.6 meq/l to 106.9 meq/l with a mean, between mine units, of 57 meq/l, or roughly 1,310 mg/l (Table 1).

Predictions of spoil water specific conductance were made using only the "mean and variances" method. Specific conductances for all Montco mine units ranged from 4,520 μmhos/cm to 13,500 μmhos/cm, with a mean of roughly 6,870 μmhos/cm. The mean specific conductance, assuming that TDS (mg/l) = 0.60 x SC (μmhos/cm) corresponds to a mean total dissolved solids content of roughly 4,120 mg/l.

TABLE A7-1

Comparison of Predicted Spoil Water Sodium Concentrations by Selected Methods

		Predicted Mean Spoil Water Sodium Concentrations (mg/l)			
		Van Voast Method		Means & Variances	Linear Regression
Mine Unit		Lower 95%	Upper 95%	Method	Method
North King	Zone 1	21.5	80	57.4	87.1
	Zone 2	24.5	98	42.7	57.3
	Zone 3	21.5	80	44.4	45.6
South King	Zone 1	23	150	57.5	87.2
	Zone 2	20	100	38.6	53.3
	Zone 3	27	105	47.3	41.1
North O'Dell	Zone 1	47.5	300	106.9	153
	Zone 2	40.5	198	73.3	84.9
	Zone 3	33	160	67.3	52.6
South O'Dell	Zone 1	21	120	64.9	98.3
	Zone 2	32	120	52.4	61.5
	Zone 3	30	110	54.5	52.5
South Gate	Zone 1	23	115	57.3	*
	Zone 2	27	100	44.3	*
	Zone 3	26	92	47.2	*

*Linear regression method not applicable to South Gate Unit because of poor correlations ($r^2 \leq 0.55$).

Note: Zone 1 represents the upper 20 feet of overburden; zone 2 represents the 40 feet of overburden above the coal; zone 3 represents all overburden above the coal.

TABLE A7-2

Summary of Predicted Spoil Water Specific Conductance
by "Means and Variances" Method

Mine Unit		Predicted Spoils Water Specific Conductance mean (μmhos/cm)	 variance (μmhos/cm)^2
North King	Zone 1	6,900	6,630
	Zone 2	4,520	2,330
	Zone 3	5,100	2,550
South King	Zone 1	7,680	5,760
	Zone 2	4,700	3,000
	Zone 3	6,320	2,400
North O'Dell	Zone 1	13,500	7,200
	Zone 2	7,490	2,740
	Zone 3	7,330	3,790
South O'Dell	Zone 1	8,280	7,480
	Zone 2	5,180	2,010
	Zone 3	5,950	2,750
South Gate	Zone 1	9,050	8,820
	Zone 2	4,850	4,850
	Zone 3	6,210	3,960

Note: Zone 1 represents the upper 20 feet of overburden; zone 2 represents the 40 feet of overburden above the coal; zone 3 represents all overburden above the coal.

APPENDIX 8

Accuracy of Montco Overburden Data

A simple statistical procedure can be used to estimate the accuracy of Montco's overburden quality data for the North King mining unit. The procedure requires a sample mean and standard deviation for both sodium adsorption ratio (SAR) and electrical conductivity (EC) for a specific depth interval for drill holes in the project area. An estimate can then be made of the sample size necessary for a given accuracy--or in this case to be within 40 percent to 10 percent of the population mean (60-90 percent accurate). The statistical procedure is outlined in widely used statistical textbooks such as Snedecor and Cochran (1967, p. 516) and Mendenhall (1975, p. 188).

In short, given the value of L as the allowable error in the sample mean, the required sample size (n) for a 90 percent confidence in L (i.e. a 10 percent chance that the error will be greater than L) is

$$n = \frac{1.64^2 \ \sigma^2}{L^2}$$

where σ = population std deviation, estimated by sample std deviation,
L = allowable error (1.00 - accuracy) x sample mean.

For example:
L at 90 percent accuracy = (1.00 - 0.90) x population mean.

Based on this statistical procedure and a sample of EC and SAR data from the Montco North King mining unit, the following number of observations (drill holes) would be needed to achieve the specified accuracy (table A-8-1).

TABLE A-8-1

Overburden Characterization Accuracy Versus Drill Holes Required, North King Mining Unit

	Accuracy			
	90%	80%	70%	60%
EC	94	24	11	7
SAR	246	62	28	16

Note: Montco North King mining unit average observations per depth increment = 17.4

To achieve a specified accuracy on the 400-acre mining area of the North King mining unit, the observation (drill hole) spacing (i.e., grid) listed in table A-8-2 would be required. Note that Montco North King mining unit spacing for drill holes with overburden analyses is 890 feet. Montco North King mining unit spacing for exploration drill holes, including drill holes with overburden analysis, is 514 feet.

TABLE A-8-2

Overburden Characterization Accuracy Versus
Drill Hole Spacing, North King Mining Unit

	Accuracy			
	90%	80%	70%	60%
EC	430 ft.	850 ft.	1,260 ft.	1,575 ft.
SAR	266 ft.	530 ft.	789 ft.	1,044 ft.

Table A-8-1 indicates that 94 holes would be necessary in the North King mining unit to be 90 percent confident that an overburden analyses for EC would be within ±10 percent of the population mean (90 percent accuracy). Similarly, 24 holes would be necessary to be 90 percent confident that such an analysis would be ±20 percent of the population mean (80 percent accuracy). Since the Montco sample data comprise an average 17.4 samples per depth increment in the North King mining unit, the calculated accuracy is 75 percent for EC data and 62 precent for the SAR data. Note that the number of samples is sometimes less than the number of drill holes because some depth intervals could not be analyzed. For example, some five-foot intervals contained coal, not overburden.

If every North King mining unit interval were analyzed for every overburden drill hole (not including exploration holes), the accuracy would be about 78.5 precent for the EC data and about 65.5% for the SAR data (figure A-8-1). If every interval could be analyzed for every drill hole--including exploration holes--for the North King mining unit, the accuracy would be about 87.5 percent for EC and about 80.5 percent for SAR. Since all exploration data were used to extrapolate between overburden drill holes, it is anticipated that the actual accuracy of the overburden quality would approach these higher values. It is therefore estimated that the accuracy of the overburden characteristics (EC and SAR) is about 80 percent. (See figure A-8-1 and tables A-8-3 and A--8-4).

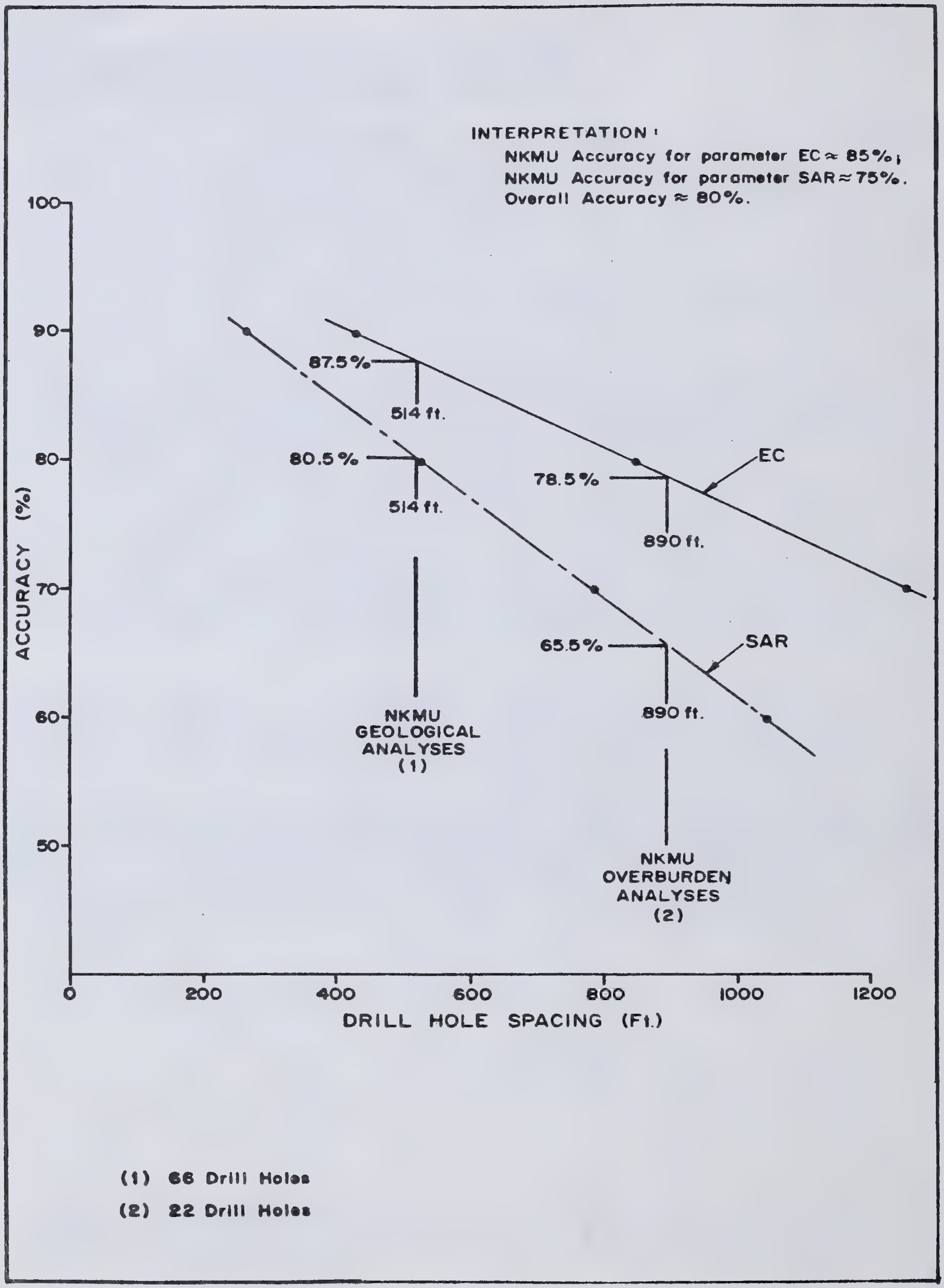


FIGURE A-8-1--Drill Hole Spacing Required to Achieve Specified Accuracy - North King Mining Unit

TABLE A-8-3
Statistical Data Calculations

		0-5 feet		20-25 feet		35-40 feet		80-85 feet		90-95 feet	
Drill Hole		EC	SAR	EC	SAR	EC	SAR	EC	SAR	EC	SAR
4449-1		6.2	5.3	2.7	2.8	2.0	2.3	ND	ND	ND	ND
4449-2C		8.9	9.0	5.8	8.8	5.0	11.8	2.9	32.2	3.1	30.5
4449-3C		8.2	33.8	4.2	33.3	2.8	33.2	ND	ND	ND	ND
4449-4C		6.5	11.1	3.5	14.8	2.5	19.5	ND	ND	ND	ND
4449-5C		1.0	15.4	7.1	15.0	3.4	41.9	3.8	48.3	4.5	51.3
4449-6C		6.1	25.8	7.7	25.9	2.9	34.5	4.2	47.5	4.1	46.7
4449-7C		6.4	7.4	0.9	1.8	0.9	3.8	1.7	9.9	5.7	8.4
4449-70BC		ND	ND	ND	ND	0.8	2.6	2.5	11.2	2.7	9.5
4449-12D		1.8	1.6	3.9	8.0	3.3	6.5	2.2	9.0	3.3	10.7
4449-16B		0.3	0.6	0.4	0.8	ND	ND	ND	ND	ND	ND
4449-16D		0.4	0.6	1.0	5.3	ND	ND	ND	ND	ND	ND
4449-17B		6.9	9.5	0.9	9.5	3.2	5.7	2.0	5.4	2.0	4.2
4449-19W		0.6	3.2	1.5	5.7	3.0	6.7	3.4	13.5	3.3	13.5
4449-20		0.4	0.7	1.5	3.4	1.0	2.2	3.2	1.2	3.3	1.2
4449-21		12.7	17.0	5.7	20.1	6.5	11.6	ND	ND	ND	ND
4449-22		2.2	4.2	8.4	11.9	5.2	28.8	2.2	43.8	3.4	50.4
4449-23R		3.5	33.2	7.1	9.9	5.0	6.1	ND	ND	ND	ND
4449-26C		0.5	0.2	4.8	4.1	8.0	11.4	4.0	66.2	2.8	58.2
4449-8A		7.95	7.51	2.45	7.59	2.18	7.99	2.58	7.95	2.20	6.85
4449-11A		1.7	2.06	0.57	0.43	0.65	0.61	1.3	1.17	ND	ND
4449-13A		9.9	25.4	3.2	40.7	4.7	45.4	ND	ND	ND	ND
4449-14A		2.51	1.84	7.95	12.9	7.02	12.0	ND	ND	ND	ND
$\bar{X}$	=	4.51	10.3	3.87	11.6	3.50	14.7	2.77	22.9	3.37	24.3
S	=	3.74	10.8	2.69	10.7	2.12	14.1	0.91	21.8	1.02	21.6
N	=	21	21	21	21	20	20	13	13	12	12

Source: Montco, 1983, app. N and supplement N-2 (Intrasearch Inc. and Dollhopf, 1983).

Note: ND means no data. This indicates that the sample could not be recovered or that the sample recovered was coal material rather than overburden.

$\bar{X}$ = mean, S = standard deviation, N = sample size.

TABLE A-8-4

Statistical Data and Calculations

Sample	Accuracy (%)	Sample Size Required EC	Sample Size Required SAR
0-5 feet	90	185	296
	80	47	74
	70	21	33
	60	12	19
20-25 feet	90	130	229
	80	33	58
	70	15	26
	60	9	15
35-40 feet	90	99	248
	80	25	62
	70	11	28
	60	7	16
80-85 feet	90	30	244
	80	8	61
	70	4	28
	60	2	16
90-95 feet	90	25	213
	80	7	54
	70	3	24
	60	2	14

Source: Montco, 1983, app. N and supplement N-2 (Intrasearch Inc. and Dollhopf, D.J., 1983).

APPENDIX 9

The Effects of Mine Closure

Comments on the draft EIS called for a description of mine closure, slowdown, or failure. Unfortunately, it is difficult to predict the consequences of any such decline. One of the reasons is that when the decline would occur is unknown. Isolated from other development, the mine would close in about 30 years. This is what the EIS portrays. But in a region with many mines, the Montco Mine cannot be considered in isolation. When other mining and industrial development are considered the decline may not come for 50 or more years.

Why the end of mining would come is another unknown. This is another reason why predicting the effects of the "bust" is difficult. A long-term prediction (over 50 years) is based on the assumption that the coal would then be depleted or replaced by other energy sources. But the most likely cause of an early ending would instead be market cutbacks based on changes in consumption patterns or increases in production of alternate coal or energy sources. Complicating any prediction is that the further into the future the predictions are made, the less accurate they are likely to be.

The draft EIS addresses two forms of mine closure: (1) Montco closing at the end of its planned mine life with no other mining in the area and (2) Montco closing at the end of its mine life with five other mines developing in the area (called the "cumulative scenario").

Two forms of closure are not described in the EIS: (1) an unexpected early shutdown, and (2) an unexpected reduction in the production level.

Early Shutdown. If the Montco Mine ceases operation early, maybe abruptly, the closure could be either temporary or permanent. A temporary closure would create a sudden loss of employment and income, but only for mine employees. If the closure lasted long enough, there would be a loss of the employment and income generated by mine-employee spending. Population probably would not fall unless the closure lasted long enough for people to begin doubting a reopening. Some social services would be temporarily strained, but most facilities and services would be relatively unaffected. The fiscal effects would also depend on the length of shutdown. If the total annual production declined, the local property tax rate could increase the following year. State and Federal revenues would be deferred until delayed production was made up. A short-term closure would have little effect on social life, but if it lasted very long, stress and conflict would probably increase within families and communities.

A permanent closure would mean a return of employment, income, and population to levels projected to exist if no mining occurred. (See chapter II.) The rate of return to no-mining levels would depend upon such unknowns as the length of time the mine had been operating, the distance to other operating mines, and the opportunity for jobs at other locations. Unemployment benefits would partially offset wage losses for about six months. Fiscal conditions would also return to near no-mining levels. If local governments had used long-term debt to finance community improvements, local tax rates could increase substantially. If physical plant improvements could not be adjusted downward to match population, the operation and maintenance costs could demand increased tax rates. Individuals would probably experience increased stress, causing increased conflict between individuals and groups, especially immediately following closure. With the passing of time, the development of new routines, and the adjustment of expectations, social life would probably return to about what it would have been if no mine development had occurred.

Reduction in Production Levels. The mine could close only partially, owing to reduced production rates. The result would be a reduction in both mine jobs and jobs generated by mine-employee spending. The number of jobs would fall in proportion to the degree of mine contraction. Laid-off workers would generally act like and be affected in the same way as victims of permanent closure, although this would vary considerably depending on the circumstances of the closure. Loss of income and population would parallel employment reductions. Net fiscal balance, local tax rates, community services, and social life would probably not be greatly affected, depending on when, how long, and to what degree annual production decreased. Contributions to the State School Foundation Program would be reduced. If life-of-mine production remained constant but took place over a longer period, State and local revenues would be deferred but totals not greatly affected.

APPENDIX 10

Estimated Densities of Reestablished Big Sagebrush, Ponderosa Pine, and Juniper.

All figures are #/acre.

Vegetation Type	Species	Proposed Seeding Rate[1]	Estimated Establishment from Seed[2]	Proposed Seedling Planting Rate	Estimated Establishment from Seedling[5]	Proposed Transplanting Rate	Estimated Establishment from Transplants[4]	Estimated Postmining Density[5]	Estimated Premining Density[6]
Ponderosa Pine/ Juniper	Ponderosa pine	25,000	250	100	50	7	4	304	239
	Juniper	13,550	136	50	35	3	2	173	423
	TOTAL	38,550	386	150	75	10	6	477	662
Big sagebrush/ grassland	Big sagebrush	5,152,800	51,528	50	38	0	0	51,566	3,723

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[1] Pure live seed.

[2] Based on establishment goal of 1 percent (Montco, 1983, page IV-3-4)

[3] Survival rate of 50 percent for ponderosa pine based on Orr (1977) and personal communications with N. Stark (University of Montana, January 25, 1984), I.B. Jensen (Western Reclamation, January 24, 1984), and M. Mitchell (Westmoreland Resources, September 14, 1983). Juniper survival may be roughly 20 percent high (Orr, 1977). The 75 percent shrub survival rate is the Department's best estimate.

[4] Survival rate of 50 percent for ponderosa pine based on Westmoreland Resources (1983, Exhibit H-8). The 75 percent shrub survival rate is the Department's best estimate.

[5] Sum of columns 4, 6, and 8.

[6] Source: Montco, 1983 (Supplements F-1 and F-7).

PUBLIC COMMENT ON THE DRAFT EIS

The Department of State Lands received 80 responses* from readers of the draft EIS, including 66 letters and 14 speakers' public-hearing testimony. The letters and testimony, as interpreted by the Department, contained 479 comments, an average of nearly 6 comments per response. The comments fell into 16 topic areas. Of these, 10 topics appeared most freqently:

1. Reclamation, soils, and overburden
2. Water quality and quantity
3. Community services and social life
4. Vegetation
5. Economics and employment
6. Policy, legal questions
7. Transportation
8. Editorial information
9. Wildlife
10. Land Use

Under these 10 topics, there were 427 comments, 89 percent of all comments. The remaining 52 comments fell into 6 categories, including (most frequently mentioned first) mine shutdown or closure; need for coal; cultural resources; pro- or anti-mine remarks; climate and air quality; and general, unclassified remarks. Nearly all public-hearing-testimony speakers were against mining. Most letter writers (62 percent) were for mining. Those for mining were usually brief, so the majority of comments (67 percent) focused on criticisms of the mine or draft EIS.

Reclamation, soils, and overburden comments came up 97 times. The concerns voiced most frequently were about overburden (55 comments), stockpile classification or location (10 comments), the effects of soils and overburden (positive or negative) on chances of reclamation success (25 comments), and 7 other general comments.

Hydrology comments were made 75 times. Surface water problems were of concern in 37 comments, while ground water was the issue in the remaining 38 comments.

Comments about community services and social life were made 74 times. The ability to provide projected service needs was the issue in 44 comments. The effects on social life or the existing culture was the concern 18 times and the remaining 12 comments were about a variety of topics.

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*Individuals or groups were counted twice if they commented in both the public hearing and in a letter. Comments submitted jointly or from a group were counted once.

Vegetation success in reclamation was the issue in 40 comments. The effects of soil and overburden constituents (especially minerals) on the potential for revegetation success was mentioned 13 times. The remaining 27 comments concerned a variety of reasons why revegetation may or may not be successful, including reference to previous successes or failures in simliar circumstances.

Thirty-eight comments were made about economics or employment. Twenty-five of these concerned the employment and income that would be generated by the mine. The remaining 13 comments concerned taxes that the mine would generate.

Thirty-one comments were made about policy or legal issues. The Department of State Land's legal requirements were the topic in 10 cases, while departmental policy was the issue in the remaining 21 comments.

The 20 transportation comments concerned a variety of topics. The topic occurring most frequently was the Tongue River Railroad (8 times). The remaining 12 comments were divided between the road system (7 times) and other topics (5 times).

Editorial and informational comments (20 times) came in a wide variety. Most were simple word changes, but a few changed meanings, which are now reflected in the EIS.

Wildlife comments were made 19 times. Most of these comments were about the impact of the mine on deer, either from habitat change or more hunting.

Thirteen comments were made about land use. Most (11) concerned the effects of mining on agriculture and ranching. The remaining two comments concerned the effects of mining on the use of Federal (Forest Service) lands.

This chapter reproduces in full all public comment on the draft EIS. Nothing has been omitted. Those people giving public (spoken) testimony were recorded on tape. For those speakers who submitted a written copy, only the written text is reproduced here. For all other speakers, a transcript was reproduced. In rare instances, we have inserted material in brackets--[]--to clarify a speaker's meaning. Opposite the public's comments are the Department of State Lands' answers.

HEARING TESTIMONY 1

MONTCO EIS (Draft) Hearing

Ashland, Mont

3 June 1982

Good evening, and thank you all for coming.

Comments by the Commissioner of State Land after the Tongue River Petition hearing, assured us that each and every mine permit application in this area would come under intensive scrutiny. We feel public participation is an important part of this scrutiny, and yet we are being asked to comment on an

A EIS on a mine application that the state has not yet found to be complete. In fact, a second, 12 paged deficiency letter has been sent to Montco this week. So in light of this, we submit this hearing s premature.

The law is very clear as to the application permit process, and it is alarming that State Lands would allow this hearing.

Therefore, we formally request a supplemental EIS be issued with a public hearing, when all the information is in and the application is deemed complete.

B We also request the comments given at hearings, along with those mailed in, be included in the EIS.

Thank you,

Mary Daniels
PRES - TRI COUNTY RANCHER'S ASSO
Birney, Mont.

A The permit application, at the time of the draft, was incomplete; that is, it did not comply with the laws, in every particular, to the Department's satisfaction. A determination of completeness is based on a myriad of legal, environmental, and technical considerations. These considerations, however, are specific to the Strip and Underground Mine Reclamation Act and are not necessarily prerequisites to preparing an EIS. Indeed, many are not relevant to the analyses of an EIS. The Department, after reviewing Montco's application, determined that sufficient project planning and environmental information had been presented in Montco's 22-volume application to undertake the development of an environmental impact statement. While Montco has made changes in its reclamation plan in response to public comments (on the draft EIS) and to the Department's review, the changes have not substantially altered the proposed mining plan, nor raised any new environmental issues. Based on this conclusion, the Department has determined that a supplemental EIS is not necessary. (See letter 48, answer A.)

Note that the public has in fact scrutinized both Montco's plan and the Department's EIS analysis, each of which have been refined to answer the public's concerns.

B The full text of all comments, both those in letters and those from the hearing, are included in this document (chap. V).

HEARING TESTIMONY 2

Wally McCrae:

I apologize for not having written testimony.

A The first thing I noticed when reading the draft EIS is that in some cases it appears that the application only covers the first 5 years, and in some cases extrapolates that into the cumulative effect. I think in every instance, whether it's environmental, sociological, economic or what it is, that the draft EIS and the final EIS must cover the entire period of mining and also the postmining period.

B I think that perhaps the Montco application is a special case, and I don't think that the problem that I have with it has ever come up before in an application. Normally there is an obvious demand for the coal coming from a particular mine, and in this case, to the best of my knowledge, there are no contracts. We don't know where the coal is going. We don't know if there is a demand. It seems to me that the first thing that should be considered in the draft, the final, or in the decision on whether or not this permit will be approved, is if there is need for the coal, if there's a need for the mine. It seems to me that the Montco Mine has some problems with the market. I think that there's a compressed coal market now, and with the problems I see, in the Montco Mine, it seems to me that very possibly the price of the coal might be prohibiting.

C There's another price that I think we should consider too, and that's the price of the community and the area and to the state and the region. To be sure, there are some short-term benefits from a permitted mine. There are some tax benefits, and there are some wage benefits. I think that there are also measured costs, and I think that rather than being short term, they're long term. I think there are environmental costs. It seems to me that we cannot just consider one life, but we have to consider that, for this one mine to be viable, there has to be additional mines. I know that's very difficult to put into your decision-making process, but I think that it is unique in the case of Montco also. When you're opening up a new area that's going to be served by a 90-mile railroad, there's no possibility that one mine can exist.

D There are a lot of social costs involved, and the question I had is, Who will pay these costs? I think that some of the costs are spelled out, but the answer as to who will pay these is not. I think that probably Colstrip has given us an indication of some of these costs.

I'm going to refer a couple, three times to the EIS. On page III-56 it says, "Coal development will greatly expand and strengthen the ties between the Ashland-Birney area and the larger society. The communities are quite isolated now, especially Birney." There's an inference there that that's a liability. I think a lot of us consider that to be an asset. The tone of it kind of bothers me.

I think that some of the social cost that has been paid at Colstrip is we are not isolated now, and I think that's one of the social costs we have paid. I think that we're also paying at Colstrip for a lot of social ills--alcoholism, child abuse, crime, family strife. I wonder if Montco is going to be as responsible as the Western Energy Company or the Montana Power Company was, because I think that the Montana Power Company has tried very hard at Colstrip to solve some of these problems that they know are inherent. So the question I have is, Will Montco be responsible in helping us alleviate some of those problems if they're permitted?

A The EIS details Montco's plans for the first 11 (not 5) years. Where enough information is available, the document covers 28 years (the life of the mine plus 4 years). The 5 years you refer to are the term of a permit, a regulatory time period largely irrelevant to the EIS.

The EIS does cover the entire mining and postmining period. Unfortunately, data to predict impacts after the first 11 years are not always detailed for every topic.

B The Montana Environmental Policy Act does not require a discussion about the "need" for the coal. Thus, no such discussion has been added to the EIS. Note, however, that the cumulative scenario relies on projected demand for coal by utility customers in Montana's market area, principally the upper Midwest. The need for the coal can be inferred from this scenario. Whether Montco, instead of some other mine, would supply the coal to fulfill this need is unknown. If Montco's coal were not priced competitively, then presumably no coal would be sold. In that case, the mine would not open.

C The analysis of the cumulative scenario considers the impacts of five mines. The impacts discussed are both short and long term.

D You seem to refer to two kinds of costs. The first kind includes social costs that cannot be paid for--loss of isolation, stronger ties to the larger society. These are psychological or social organizational costs that are borne without financial compensation to individuals or groups. The second kind of costs are these that can be paid for--that is, impacts that can be mitigated by spending money.

Unfortunately, it is not known unless a mine permit is issued what would be required of Montco. We do know that some costs could be paid for by grants from the Coal Board. Others could be paid for by various arrangements set up after negotiations between all concerned parties, including industry, residents, and government agencies.

We do not intend to judge the isolation of the Ashland and Birney areas as good or bad. Note the references to the DSL survey data: On page II-64 and II-67 the EIS notes that residents view the "loss of privacy" as a disadvantage and privacy as "what people like most about the area." Pages III-56 and III-57 go on to discuss additional disadvantages--the three concerns of residents over the strengthening ties with the larger society.

HEARING TESTIMONY 2

E I quote on again page III-56: "The company has not established a policy for assisting local communities and probably would not provide assistance absent of specific requests." I'm wondering if specific requests are made whether or not Montco will provide assistance. On page III-49 it is mentioned that this development will introduce new social values. I wonder if that is an asset or a liability.

E We do not know what kind of assistance Montco would offer to provide. The survey responses (see answer D) give some indication about what residents think about the introduction of new values.

F We've had a lot of new social values introduced at Colstrip, some of them positive, and quite a number of them negative. Colstrip is mentioned again and again, and maybe I'm guilty of the same thing, but there's a quote, Colstrip will gain population, Colstrip could provide housing. Another quote, additional population at Colstrip. It seems to me that if Colstrip is the answer to solving a lot of the problems that Montco will bring up, why not mine the coal at Colstrip? We already have an industrial area there. If there is a demand for the coal, I think that Western Energy Company would be tickled to death to sell it. I don't think that we need to open up the new area.

F Comment noted.

G A lot of places, it seems to me, that the EIS is asking questions rather than answering them. I refer to IV-4. There's a whole laundry list of community services that will be required, but there are no answers as to who is going to provide them. Under housing: "...either Montco or some public agency could take in mitigating housing problems created by Montco Mine development...." Under facilities and services: "The following are actions Montco could take in mitigating the strain on facilities...." Under education: "The following are actions Montco could take in mitigating the strain on education facilities...." Health services: "Montco could institute...." Sociology: "Social impacts could be reduced by Montco if...." Recreation: "Conflicts could be reduced if Montco funded a public relations program based on information from local landowners, the Northern Cheyenne, and the Forest Service...." Montco could, in addition, cultural resources and "...mitigate their destruction...." Montco could, etc., etc. My question: Is Montco going to do this, any of these things?

I wonder how responsible Montco is going to be, and I think that we have an idea. I think we have an indication of the responsibilities that Montco is going to bear for the disruption of these communities. Montco has threatened 50 ranchers on the Tongue River with condemnation through the railroad. They tried very hard for a federal subsidy to build the railroad. They're opposed to the coal severance tax that would pay for local impacts. I think it was at the scoping hearing that we asked a question about their responsibility for the school. They refused to acknowledge any responsibility for helping out on the impact of the school here in Ashland. Montco tried to exempt their railroad from public and agency review by changing federal laws, and Montco closed down the Coal Creek Mine.

G The listed items you refer to are suggestions, not requirements. Again, it is not known (unless a permit is issued) what would be required of Montco. Indeed, in many cases it may not be known what form mitigation of socioeconomic impacts would take and who would be responsible until after mine development is under way and public agencies (both local and State) have had an opportunity to evaluate real changes and methods to deal with the changes. For this reason, answers to questions about community service needs and who will do what are beyond the scope of the EIS. Further, some of the mitigating measures listed are beyond the authority of the Department. An example is the suggestion that local jurisdictions establish joint powers to allow sharing of tax revenue.

H I think that the EIS should address what happens when the mine is closed, and that's eventually going to happen, and I think that we should know what those effects are going to be. Especially: What are those effects going to be if it closes before 24 years are up? What if it closes in less than that?

I think we have a precedent in Colorado with the synfuels plant that Exxon just closed down with one-day's notice. How well are we going to be prepared for that kind of a bail out?

H The draft EIS addresses three scenarios--no additional mines, Montco mine development, and cumulative mine development. There are countless variations of these scenarios, a few of which you mention. Although it is not practical to deal with all the possibilities, appendix 9 has been added to the EIS to better explain the effects of closure.

HEARING TESTIMONY 2

I One of the reasons that the EIS raises more questions than answers is
it's very difficult to write or comment on an EIS until the permit application
is complete and the applicant acknowledges that they have responsibilities and
what those responsibilities are and what responsibilities they will meet, or
the alternative choice to hoist them off on existing local residents or local
J government. I think the biggest problem that I have is the EIS ignores
postmining socioeconomic impacts.

Thank you.

I See testimony 1, answer A.

The EIS gives an analysis of impacts under Montco's plan as now proposed. As a result, the analysis illustrates the worst of circumstances. Any mitigating measures required of Montco would reduce the impacts described in the EIS.

J See answer H.

HEARING TESTIMONY 3

Statement of Bill Gillin

Chairman, Northern Plains Resource Council

Montana Department of State Lands in their decision of December 22,1981 rejecting Northern Plains Resource Council and its affiliates petition to designate lands unsuitable for surface coal mining stated, "Thus, while it is possible that reclamation may not be possible in specific areas or that special handling may be required in specific areas, this can only be ascertained by intensive characterization of soils and overburden, and by knowing the methods of handling, all of which is included in mining and reclamation plans:.......although it appears that shallow soils occur in numerous locations in the petition area, the evidence indicates that suitable materials also occur. Thus, any determination of reclaimability for a specific area cannot be made until more area-specific data and a mining and reclamation plan is submitted."

I assume that this was a committment by the Department of State Lands to take a long hard look at all the questions raised in the petition. This E.I.S. does not adequately address many of these problems. There is still very little infor-

A mation on site specific problems. Water degradation is dismissed as minor, yet Monteo's plans to avoid water degradation are sketchy or totally inadequate. The

B E.I.S. recognizes the possibility of reclamation failures on certain areas but assumes that much of the area may be successfully reclaimed. So far no strip-mined area in Montana has been successfully reclaimed so why is it assumed that this area with minimum amounts of top soil, high rates of toxic material in much of the spoils and company plans for recontouring that are highly susceptible to erosion should be a success? From a reclamation standpoint this is a very marginal area and the permit should be denied.

C One statement in the E.I.S. that should be corrected occurs on Page 30, Chapter 3 reads, "Grazing trials on reclaimed lands at Western Energy Company's Rosebud Mine at Colstrip have shown that in some cases postmining stocking

A We assume that in saying "sketchy" you are referring to Montco's failure to include an acceptable drainage control plan in its permit application. This deficiency, if uncorrected, would result in impacts. But in fact Montco must submit an acceptable plan before the granting of a surface mining permit. The preparation of such a plan requires straightforward engineering, not typically of the kind that requires significant changes in the mine plan. Montco's final drainage control plan, of whatever kind, would not significantly alter hydrologic impacts.

B If by "successfully reclaimed" you mean released from bond, you are correct. To date, no reclamation areas have been released from bond. This is partly due to the legal minimum time required (about 10 years) to make a judgement on the successfulness of reclamation. The other reason is that companies have not applied for final bond release on areas that are eligible under the old 5-year minimum time requirements. In the meantime, the Department monitors the reclaimed areas (looking, for example, at vegetative reproduction and diversity, response to grazing pressure, and upward migration of sodium and salts in the soil) to evaluate the success of reclamation.

Montco has revised its reclamation plan since the draft EIS. Note that enough soil is available for successful overall plant growth after reclamation; enough favorable overburden material is available for an 8-foot rootzone; and no serious erosion is expected. See revised text in chapter III, Geology, Soils, and Vegetation.

C The sentence you refer to has been deleted from the final EIS.

HEARING TESTIMONY 3

rates are roughly double the premining rates." This refers to an experiment that was conducted for the purpose of determining if very heavy rates of stocking at certain seasons could lessen the competitiveness of introduced species and increase the competitiveness of native species in a mixed species planting. The cattle were not weighed in or out and it was not meant to be a test of stocking capacity. To see a statemeny like this used to infer that reclamation in the Ashland-Birney area can be successful cast much doubt on the entire E.I.S.

D Because of the inadequacies in Monteo mining plans, I would like to suggest that after the company has submitted proposals to properly address these inadequacies, a supplemental E.I.S. be issued and public comments be received for at least sixty (60) days after this document is made public.

Countless millions of dollars have been invested by ranchers who are downstream from Montco minesite into developing irrigation along the Tongue River. E It is now one of the most productive valleys in Montana. The possibility of reclamation at this mine is marginal at best and the possibility of erosion and water degradation is high. To risk damage or destruction to agriculture on the F lower Tongue River valley for a mine of very doubtful economic feasibility to supply a market already burdened with a huge oversupply of coal would be sheer folly.

The Department of State Lands has never denied a permit for strip mining. This is a permit that should be denied.

D Please see testimony 1, answer A.

E Erosion at the Montco Mine, judging from the mine reclamation plans, would probably be no greater than at any other surface coal mine in Montana.

Degradation of irrigation water would be minimal and would not result in damage to agriculture. (See the draft EIS, p. III-17, and app. 5.) The predicted changes in Tongue River water quality from Montco's mine would be too small to measure using standard laboratory methods.

F See testimony 2, answer B.

HEARING TESTIMONY 4

RECEIVED
JUN 10 1982
STATE LANDS

June 3, 1982
Montco Mine hearings on
the Draft EIS
Greg Waldie

My name is Greg Waldie. I am a rancher and concerned citizen of the Tongue River area. These proposed mines and railroad will seriously affect my family's means of existence.

A Under "Land Use" on page 4, (of the DEIS) it states that, "the mine would not significantly affect the pattern of land uses in the region." However, the proposed railroad is an essential part of the mine and needs to be addressed as a part of the mine.

B The Montana Environmental Policy Act requires the state to use all practical means and measures to ensure that the rights of the general public are not infringed upon. This act also stresses that primary, secondary and accumulative impacts must be addressed to their fullest. Therefore, the Montco mine permit has some very serious deficiencies that need to be answered before the permit is issued.

As an example, one clear fact that is not in this report is that the mine cannot operate without a railroad. The accumulative impacts must be studied on several mines because the proposed Tongue River railroad needs several mines to be economically feasible. The DEIS does not address the accumulative impacts in the Tongue River Valley concerning mining and the railroad as a single operation. Because, without one, the other cannot exist. Therefore the statement in the DEIS under "Land Use" is a falsehood.

C It is stated in the DEIS that the TRR would take 1802

A&B Although a number of individual ranches would be affected by cumulative development (the railroad and five mines), the pattern of land uses in the region would not. As a result, the summary statement in the EIS has not been changed. The railroad impacts are included in the discussion of the cumulative scenario. (See p. III-75 of the draft.) The impacts of four more mines are also included throughout the EIS. (See Community Services, Transportation, Fiscal, Hydrology, Sociology and other sections in chapter III.) Note that each new mine would be evaluated in accordance with the Montana Environmental Policy Act as permits for additional mines are applied for. The impacts of the railroad are discussed further in the EIS by the Interstate Commerce Commission (1983).

C The estimate for the right-of-way was supplied by the engineering firm designing the railroad. The acreage figure (1,802) in the EIS was the most

HEARING TESTIMONY 4

Page two - Waldie

acres for right-of-way. According to what Tom Ebzery told me as a landowner, with the cuts and fills, the right-of-way could vary from 150 feet to over 1000 feet in width and have an average of 300 feet in width. This 300 foot average times the 89 mile length of the railroad would take 3236 acres just for the railroad, and that does not include the additional service road.

D The proposed routing in the Tongue River Valley would seriously restrict our management flexibility in that it separates our buildings from all of our pasture land. The railroad goes through our winter range, through our calving pasture and our bull pasture and separates the cattle from the main source of water which is the Tongue River. If the proposed Tongue River Railroad goes through, we will have to change our operation from a cow-calf to a yearling operation. This would change our operation from selling a product we raise to buying and selling.

The reason we would have to change our operation is because when pairs are separated by wash-outs or an object that cannot be seen through, they stand and bawl at each other rather than go to the end of the obstacle.

E Another problem would be reduction of potentially irrigable ground. There would be design and drainage problems in the irrigation system on this prime riverbottom land which is over a mile long. This land should come under the Farmland Protection Policy Act of 1981.

F According to another rancher and myself, we have very conservative figures on land that will be affected by the Tongue

accurate available at the time the draft EIS was prepared. The Tongue River Railroad draft EIS gives an average width of 200 feet for the railroad. The actual right-of-way width would vary depending on the size of cut and fill slopes (ICC, 1983). The text has been revised accordingly.

D Comment noted. Thank you.

E Comment noted. Thank you.

F See answer C.

River Railroad. In Custer County alone, there will be over 1300 acres of irrigated land and 1790 of potentially irrigated acres cut off or severed, making the land unusable for irrigation. Also 3320 acres of dryland pasture will be taken out of production. In addition, the proposed railroad would cause the replacement of approximately $725,000 worth of corrals, sheds, main irrigation ditches and other major improvements. This does not include pivot irrigation systems. TRAPA members estimated an additional $75,000 per year loss along the railroad route due to livestock loss, weight loss due to train traffic, and increased operating costs and inconvenience. This does not include the loss of resale value as a ranching unit.

These impacts need to be addressed in this DEIS because the mine and railroad are co-existent.

HEARING TESTIMONY 5

Eugene Wood:

A I don't have any comment on the EIS. On behalf of Powder River County and the Town of Broadus, I would like to make a protest that the hearing was not properly advertised. We had no notice in Powder River County of the hearing.

Kit Walther (Department of State Lands):

We advertised it in 3 newspapers.

Eugene Wood:

It wasn't in the Powder River paper. Ordinarily we get a notice at the courthouse. We didn't get one this time.

Kit Walther (Department of State Lands):

We advertised in the paper out of Forsyth, Miles City, and Billings.

Eugene Wood:

Yesterday was the first time that I knew about the hearing, by way of the grapevine.

Brace Hayden:

Okay, thank you.

HEARING TESTIMONY 6

Gail Small:

Good evening. My name is Gail Small. I'm a member of the Northern Cheyenne Tribe, and I just returned home from 3 years of law school the other day, and I wanted to come.

I just had a brief chance to review the environmental impact statement, but prior to my departure from the reservation for law school, I was involved through the Northern Cheyenne research project and the initial contacts the Northern Cheyenne had in participating in the Montco environmental impact statement through the Department of State Lands. As I recall at that time, the tribe had considerable problems at even becoming a participant in the development of the environmental impact statement. That was the pattern that had been established throughout the development--energy development--for this region.

A The Northern Cheyenne Tribe has had a very difficult time participating in EISs. We have never been considered a local government entity through the national environmental impact statement or through MEPA, the Montana Environmental Policy Act. As tribal government, we are not considered, I guess, local government entities that should be directly consulted. There are going to be no environmental impact statement hearings on the Northern Cheyenne reservation, which I think is just a gross violation of intent of the National Environmental Policy Act.

B I think there should be a hearing held in the Birney Village. Birney Village is the most traditional village on the Northern Cheyenne reservation, and most of the people in Birney Village have no idea of the magnitude of the development that is being planned in this area. One day, our most traditional people, many who don't even speak English, are going to wake up and be totally surrounded by energy development. That is the magnitude of the situation at Birney Village. To me it's just gross violation of the intent of the National Environmental Policy Act that we have these hearings off the reservation where very few of us can even travel. These people on the Birney Village have no access to cars. They have very little understanding at all of what environmental impact statements are about, and I would encourage the Montana Department of State Lands very much to at least have a hearing on the Northern Cheyenne reservation, if not in the Birney Village itself.

C Another important point, I think, is the Northern Cheyenne are and have attempted to be in the forefront of these environmental concerns across Indian country for many years. A classic example of that is the fact that the Northern Cheyenne petitioned for and won Class I air quality. The Northern Cheyennes, however, were not asked to participate in the Montana Department of State Lands air quality analysis nor in the water quality analysis of this document. All we were able to participate in was the socioeconomic impacts.

D My question to the Montana Department of State Lands is the basis for their denial should they decide to deny this mining permit. Is there a basis to deny this mining permit on the basis of socioeconomic impacts? Do we, as the Northern Cheyenne Tribe, have much credibility or real impact in the actual denial of this application through the socioeconomic evaluation that we've been able to participate in?

A The Department contracted with the Northern Cheyenne Planning Office, through the Tribal Council, to conduct a study that would "identify, describe, and evaluate probable social and economic effects [of the Montco Mine] and suggest mitigation measures." The tribal government was the only local government in the area that was so intensively involved in the preparation of the EIS.

B Copies of the draft EIS are available by mail on request from the Department of State Lands for those desiring information on the mine. Comments on the draft mailed to the Department have been considered equally with those comments given at the hearing. The Department's intent is to disseminate, not suppress, information on the mine's likely impact, and to consider equally the questions and comments of all those interested in the mine.

C Water and air quality analyses are generally performed in ways dictated by technical or scientific methods. Collection of field data and subsequent calculations and predictions would not appropriately involve public participation. The EIS provides the public the opportunity to study and comment on the agency's analyses.

D The permit may be denied on the basis of impacts within the scope of the Strip and Underground Mine Reclamation Act (82-4-227 MCA). Whether the permit may also be denied based on impacts not within the scope of that act is another question--one of whether the Montana Environmental Policy Act (MEPA) provides regulatory authority, and thus is substantive, or is an impact identification act, and thus is procedural. This has been discussed and debated since enactment of MEPA in 1971. The Department of State Lands and other state agencies which must comply with MEPA were forced to take a position on this question in order to carry out their duties. As a result of the Montana Supreme Court opinion in Montana Wilderness Association v. Board of Health and Environmental Sciences 171 Mont. 477, 559 p2d 1157 (1976), the Department of State Lands and other state agencies considered MEPA to be procedural. There have been no Montana Supreme Court decisions since these two which would alter this conclusion.

There have been two fairly recent District Court opinions on this subject. In Northern Tier Information Committee v. Northern Tier Pipeline Company (Lewis and Clark Co., Cause No. 44987, 1980) the District Court stated that MEPA is a procedural statute. In Cabinet Resource Group et al. v. Department of State Lands, et al. (Lewis and Clark Co., Cause No. 43914, 1982) the same District Court held that MEPA provided regulatory authority over the ASARCO Inc. mine at Troy. This latest decision is binding on the Department of State Lands with respect to the Troy mine, unless overturned by the Montana Supreme Court. The effect of this case on the Department's administration of the Strip and Underground Mine Reclamation Act is unknown at this time.

HEARING TESTIMONY 6

	I think that if we had been able to participate in the air quality evaluation and the water quality evaluation, in which we could have had much more impact, [we] would have had much more clout in the actual analysis, whether the Montana Department of State Lands is going to deny this permit or not.	
E	The point that Wally brought up is that this EIS is only for 5 years. I think that it's very important that the Montana Department of State Lands consider the fact that there needs to be a comprehensive regional EIS for the entire energy development area that would be proposed in this region, not only on Colstrip. We have little EISs. I've been to many of these hearings, and I've spoke of many of these hearings, and I recognize many of you out there. We always come to these hearings to get some steam off, but nothing ever gets done because there never has been a regional EIS. There should have been a regional EIS, and I encourage the Montana Department of State Lands to consider the impacts of Colstrip, consider the impacts of the Tongue River Railroad, consider the impacts of Montco all in one conglomeration, because they are not independent. They are all interrelated. They need to be examined and analyzed on that because our water, we all know--many of you are ranchers, many of you are Indian people out there--we all know that the water issue is interrelated. We know that the Yellowstone River, the Rosebud Creek, the Tongue River are all interrelated. So why do we have to sit by and let these administrative agencies examine these on an independent basis when everything is cumulative in this area? The Class I air on the Northern Cheyenne [Reservation] is not any different from the air here in Ashland, but yet we have to go through the process of acquiring the Class I air. We've been trying to enforce it since 1977, and it has yet to be enforced. Many problems that I'm not going to have time to get into now.	The 5 years you refer to are the term of a permit. The EIS covers in detail 11 years and more generally 28 years. See also testimony 2, answer A. A comprehensive EIS such as the one you mention has already been written (U.S. Department of the Interior and Montana Department of State Lands, 1980). The regional EIS, as it is known, described a range of development in the Northern Powder River Basin of Montana. Included in the discussion was the Montco Mine.
F	I think there needs to be some site-specific impacts that are not addressed in this document that need to be addressed more thoroughly. The water and air quality standards in this document are not thorough enough. The reclamation feasibility was gone over very well.	We assume you mean that the water quality standards used in the draft to describe water use limitations are either inadequate or not sufficiently comprehensive. All water quality standards and comparisons used in Montana's mining regulatory program, as well as in the EIS, are in common use in the West. Montana drinking water quality standards are similar to those accepted by the federal government. References made in the draft to water quality acceptability for livestock and irrigation uses are based on accepted standards developed by the U.S. Environmental Protection Agency (1976) and the National Academy of Science (1973). Accordingly, we believe the water quality standards in use are the most effective and accurate means available to describe constraints on water use.
G	The basis for the denial is that the mine permit needs to be examined. On what basis do these gentlemen have to deny this mine permit? On what basis would they actually consider denying this mine permit? Those are the bases that we have to consider, if we want to get any clout or credibility in these hearings.	See answer D.
H	The socioeconomic impacts are on page III-52. Like I said, I had very little time to go over this, but I just went over the part on the Northern Cheyenne, and it says that the impacts are not known. The magnitude of these impacts are not known. The magnitude of these effects on the Northern Cheyenne is not known. When are we going to know these impacts?--24 years down the line? These impacts need to be known today. We need to be able to assess these impacts.	Pages III-62 and III-63 of the draft are mostly devoted to itemizing probable impacts on the Northern Cheyenne. The magnitude of the social and cultural impacts cannot be determined because such phenomena are not readily quantifiable. Since we cannot attach numbers to culture, family life, or values, we cannot project their future magnitudes or amounts. Where numbers can be used, such as the percent having an attitude of some type or the percent speaking a language, the numbers are given. Even in the case of attitudes and language, however, we do not have adequate information or methods to project future changes.
I	Another point is, How are we going to provide the money to mitigate these impacts? The Northern Cheyenne Tribal government is like most other governments: They are having a very difficult time even surviving. Where are we	Since publication of the draft, and passage of Senate Bill 186 by the 48th Legislature, the law governing coal impact assistance has been changed:

HEARING TESTIMONY 6

going to get these impact monies? We are not eligible for state impact monies that other local communities in this group and state could get.

We, as the Northern Cheyenne Tribe, will have to develop impacts for
people crossing the reservation. It says on page III-63 that these non-
Indians are going to be moving into the area and commuting across the reserva-
tion on our roads. Are we going to be getting any [impact money] to mitigate
their moving across our reservation for our roads? No, we're not eligible for
J that. Where are we going to get those monies to mitigate our impacts? But
they're not known. That's what the document says. Our tribal participation
has been very little. These things need to be addressed now, not 24 years
down the line, and I think that the document itself and only analyzing the
first 5 years needs to be seriously reconsidered. It's just not logical to
analyze a mine in these terms 5 years. Is it going to be in existence for 24
years.

K Then it talks about what is being Cheyenne. What does it mean to be Cheyenne? Throughout the document it says powwows. Powwows is not all that it is to be a Cheyenne. Powwows are a social function. It's not a spiritual function, or anything that way. The document seems to me as being a Cheyenne--being a Cheyenne is not all powwows. Sure I participate in powwows, I dance, I enjoy it, but that is not being Cheyenne, and that's how they and how this document needs to be seriously reconsidered from the Northern Cheyenne perspective.

We need hearings on the reservation. We need to assess a cumulative impact. We need a comprehensive environmental impact statement assessing the regional energy impacts. We don't need separate impacts. I was at the Tongue River Railroad EIS hearing we had in Miles City. Some lady came up from the Interstate Commerce Commission and we went over and over these comments. Wally got up and said the same thing. We do this over and over and over. But yet we never get anywhere. We're going to have to band together as we've done before and cry out and get regional environmental impact statements and make the National Environmental Policy Act work, make the Montana Environmental Policy Act work, make the Montana Department of State Lands apply the law as it was really intended.

Thank you.

The Northern Cheyenne Tribe may now apply to the Coal Board for grants and loans.

The roads on the reservation that are identified as most likely to be affected are FAP 39 between Colstrip and Lame Deer and FAP 37 (U.S. 212) between Lame Deer and Ashland. These roads are maintained by the state and by Rosebud County. The Northern Cheyenne Tribe would not be financially affected by the increased maintenance costs projected.

J See answers C and E.

K The EIS does not stress powwows to the degree you suggest. Participation in powwows is discussed only as one way Northern Cheyenne interact socially.

HEARING TESTIMONY 7

Patty Kluver:

My name is Patty Kluver. I'm representing Genie Land Company. I came up here as kind of a debt of gratitude to the Tri-County Ranchers Association. I owe them a very great deal. I also rather owe the last speaker a little bit. I kinda owe this country, because I'm not interested in the socioeconomic situation, but I am interested in the environment and, primarily, God knows, the water.

A I noticed in here in your hydrology section--which is a riot--that this Tongue River Valley, "Talking Water," is really unique. I guess you're the hydrologist. It is most unique of any place I every saw, because contrary to all ground water studies that I've seen in this area, where ground water passes from east to west in a southerly direction, by gosh, Tongue River ground water at the Montco Mine goes northwest. I just---it's really unique, and I really am troubled by it. It's not contrary to even what they say in the Powder River big one from the BLM.

B Another thing that I noticed that you put in here several places is about the water, ground water, that will be coming out of this little o' mine, and you've just wrote iron right off the book. A lot of people don't know what iron is. This book says its the fourth most abundant, by weight, of elements that make up the earth's crust. It says a lot of other things, and I'm sure that the Department of State Lands must have this book. It's the Quality Criteria of Water from the EPA, costs $6.50 3 years ago, probably $12.50 now.

Anyway, for example, if iron is discharged--I'm going to edit this because a lot of this is a little bit out of my line on language--it says if it's discharged and turned into hydrogen sulfide, it creates ferrous sulfide. Ferrous sulfide is a black compound and results in the mineral mud. Brother, I know about that. Iron is an objectionable constituent in water supplies for either domestic or industrial use. That's the reason why Colstrip doesn't use their mine water in their surge pond.

Iron appreciably affects the taste of beverages and can stain laundry, clothes, and plumbing fixtures, and if you don't believe me about that, I'll just show you just exactly what iron did from Colstrip in our clothes. I have this towel. This towel was white. I've chucked it--it's one of my most precious possessions.

Another thing that iron does--and I'm just zoning in on iron because it's something you can see if you look at the water. In an iron-polluted Colorado stream, neither trout nor other fish were found until the waters were diluted and the iron had been precipitated to effect the concentration of less than 1 percent. In this book they won't even measure it if it's so high. It always comes off the coal.

The smothering effects of settled iron precipitates may be particularly detrimental to fish eggs and bottom-dwelling, fish-food organisms. Don't kid yourself it isn't. They can't raise fish in those--they couldn't, I should say. They pumped that all out on us, I guess. Settling iron ponds have also been reported to trap and carry diatoms down into water. There's a world of other things.

A We are unfamiliar with any reliable study to date which indicates regional groundwater flow "from east to west in a southerly direction." Near-surface groundwater around the Montco Mine generally flows northwest toward the Tongue River, because the river is the primary groundwater discharge area in the region. Other, deeper aquifers have different groundwater flow patterns, less influenced by the Tongue River or near-surface geologic structure. You may be referring to these deeper aquifers.

Hopkins (1973, Sheet 1) indicates in the Tongue River Member of the Fort Union Formation in the Montco project area groundwater generally flows northwestward toward the Tongue River. Data submitted by Montco for the strata along the east side of the Tongue River between Birney and Ashland confirms this. As noted in the draft (p. II-3), the Tongue River Member contains the stratigraphic interval of economic interest to Montco.

B The hydrochemical conditions that produce acid mine discharge and high concentrations of dissolved iron are not known to occur in southeastern Montana coal fields. The problem you mention--excessive iron concentrations in spoil leachate--arises in some mining regions, primarily, the eastern U.S., but would not arise at the Montco Mine. Coal mining in the Powder River Basin is not conducive to the formation of sulfuric acid and iron dissolution. Backfilling the spoil at the Montco pit would assure that sulfur-bearing minerals in the overburden would be below the postmining water table in an oxygen-poor, postmining environment. This would further hinder the formation of sulfuric acid. You appear to have mistaken the limited, natural dissolved iron in shallow groundwaters in the Montco project area with the excessive dissolved iron associated with coal mining in other regions.

HEARING TESTIMONY 7

C Iron at exceedingly high concentrations has been reported to be toxic to
livestock and to interfere with the metabolism of phosphorous. Dietary
supplements of phosphorous can be used to overcome this metabolic deficiency.
That's one the things one of those little fellows from Colstrip came over and
D told us--we had a phosphorous deficiency. He didn't tell us it was iron in
the water that was pouring down and killing all the vegetation.

Anyway, I think that if you like fishing in the Tongue River, and if you
are like me and like the environment better than you do the people, then you
better take a second look at this thing and redo it. Gee, in the back of that
thing is some pretty horrible other stuff. I just marked one, because the
E irreversible and irretrievable commitments of resources--boy, that's true. It
is irreversible, and that iron will be flowing down here for thousands of
years, and Mr. Montco will be long gone and so will, by the way, the Coal
Creek Coal Company. It's gone already, isn't it? In its place is WESCO.

Thank you.

C See answer B.

D See answer B.

E There is no evidence to indicate that "iron will be flowing down here for thousands of years." Present dissolved iron concentrations in the Tongue River are insignificant. They occur naturally and no change in this situation is expected as a result of mining by Montco.

HEARING TESTIMONY 8

COMMENTS SUBMITTED BY ART HAYES JR. AT THE HEARING ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED MONTCO MINE. JUNE 3, 1982, ASHLAND, MT

MY NAME IS ART HAYES JR. I LIVE IN BIRNEY, MONTANA. I'M HERE TO EXPRESS MY CONCERNS WITH THE RECLAMATION PLAN FOR THE PROPOSED MONTCO MINE.

A IT HAS BEEN DIFFICULT FOR ME TO PUT TOGETHER COMMENTS DUE TO THE LACK OF CONCRETE PROPOSALS CONCERNING RECLAMATION IN THIS DOCUMENT. THERE ARE SO MANY "COULD BE", "SHOULD BE" AND "MAYBE" STATEMENTS IN THIS EIS, THAT IT IS IMPOSSIBLE TO FIGURE OUT WHAT RECLAMATION PLAN IS GOING TO BE USED.

B THIS EIS DOES SUPPORT OUR PREVIOUS CONTENTIONS THAT RECLAMATION IN THIS AREA IS NOT FEASIBLE. IT POINTS OUT PROBLEMS WITH HIGH LEVELS OF SALTS, SODIUM, TOXIC TRACE ELEMENTS AND CLAYS, ALL OF WHICH ARE MADE MORE SIGNIFICANT WHEN CONSIDERED WITH A VERY SHALLOW SOIL COVER.

C TO COMPENSATE FOR THESE PHYSICAL AND CHEMICAL PROBLEMS, MONTCO PROPOSES SEVERAL THINGS: FIRST THEY STATE THEY CAN SELECTIVELY SEPARATE THE FAVORABLE OVERBURDEN FROM THE UNFAVORABLE. TO DO THIS, THEY PROPOSE TO USE A COLOR CODING TECHNIQUE THAT HAS NEVER BEEN TRIED UNDER MINING CONDITIONS. EVEN IF THIS METHOD PROVED FEASIBLE, WHICH I DOUBT, MONTCO WOULD STILL BE PUTTING CONTAMINATED MATERIAL INTO THE ROOT ZONE, THEREBY INCREASING THE CHANCE OF REVEGETATION FAILURE. APPARENTLY, TOXIC TRACE ELEMENTS LIKE NICKEL AND BORON DON'T CORRELATE WELL WITH THIS UNTESTED COLOR CODING TECHNIQUE.

D THIS APPROACH IS MADE MORE UNCERTAIN WHEN YOU CONSIDER MONTCO'S LACK OF KNOWLEDGE OF THE OVERBURDEN CONTENT. THEIR SAMPLING ONLY ALLOWS FOR A 60 TO 70 PER CENT ACCURACY IN DETERMINING OVERBURDEN QUALITY. THE EIS STATES THAT TO ACHIEVE 90 PER CENT ACCURACY, TEST HOLES MUST BE DRILLED EVERY 100 TO 150 FEET, AND THAT THIS WOULD BE "COST PROHIBITIVE".

A The draft EIS discusses only one reclamation plan. Where the words "could" or "should" are used in the document, mitigating measures are being discussed that are not currently in Montco's permit application. It is up to the Commissioner of State Lands to decide which mitigating measures (if any) would be required in a permit. Note that Montco has revised its reclamation plan since publication of the draft EIS. The EIS text has been changed accordingly. (See chapter III.)

B The draft EIS does not contend that reclamation in this area is not feasible. It did point out a number of potential problems with Montco's reclamation plan. Note, in any case, that many of the problems discussed in the draft EIS have been addressed by Montco in its revised plan. (See chapter III.)

C An adequate volume of favorable overburden exists in the North King mining unit to establish a layer at the surface of the regraded spoil at least 8 feet thick. Montco has abandoned its plan to use color and lithology in the field to separately salvage favorable overburden. The company now plans to use isopach maps, as suggested in the draft EIS. (The isopach maps are, however, based partly on color and lithology.) See the revised text in chapter III.

D Montco has revised its overburden handling plans. See revisions in chapter III and appendix 8. Note that the accuracy of the overburden data is about 80 percent according to Montco's calculations. The mention of cost in the draft EIS was inappropriate and was deleted. See also letter 48, answer G.

HEARING TESTIMONY 8

COMMENTS OF ART HAYES JR, 6/3/1982

WHEN THE TONGUE RIVER UNSUITABILITY PETITION WAS DENIED, ONE OF THE REASONS WAS THAT SUFFICIENT SITE SPE CIFIC DATA WAS UNAVAILABLE, AND THAT SUCH INFORMATION WOULD BE GATHERED AND ADDRESSED IN THE MINE PERMITTING PROCESS.

NOW WE ARE TOLD THAT GATHERING THE AMOUNT OF INFORMATION NEEDED TO MAKE AN ACCURATE ASSESSMENT IS TOO EXPENSIVE! CONSIDERING THE HIGH AMOUNTS OF TOXIC AND OTHER GROWTH PROHIBITIVE MATERIAL IN THIS AREA, A 90 PER CENT DEGREE OF ACCURACY SHOULD NOT BE CONSIDERED COST PROHIBITIVE.

E THE EIS ALSO STATES THAT UNFAVORABLE CHEMICAL OVERBURDEN AND CLAY MATERIAL CAN BE DILUTED BY THE MIXING THAT OCCURS DURING THE SPOIL REMOVAL PROCESS. THERE ARE SEVERAL PROBLEMS WITH THIS: FIRST, MONTCO PROPOSES TO DIRECT HAUL WHENEVER POSSIBLE. THIS WOULD PROBABLY NEGATE ANY DILUTION THAT MIGHT OCCUR IN THE PROCESS. SECOND, THE IDEA THAT MOLYBDENUM, NICKEL, SELENIUM AND OTHER TOXIC ELEMENTS PLUS SALTS AND CLAYS WILL BE DILUTED DURING OVERBURDEN REMOVAL NEEDS TO BE QUESTIONED. THIS CONCEPT WAS TAKEN FROM A STUDY DONE BY DOUG DOLLHOPF AT WESTERN ENERGY, AND THE USE OF THAT RESEARCH HERE, IS BEYOND THE CONTEXT OF THE ORIGINAL STUDY.

F IT IS MENTIONED MANY TIMES THAT ENOUGH FAVORABLE OVERBURDEN EXISTS TO COVER THE SPOILS TO A DEPTH OF 8 FEET. CONSIDERING THE PROBLEMS MENTIONED EARLIER WITH SEPARATING THE FAVORABLE FROM THE UNFABORABLE, THIS IS HIGHLY IMPROBABLE.

G HOWEVER, EVEN IF THIS WAS THE CASE, DOES ENOUGH FAVORABLE OVERBURDEN EXIST TO ADEQUATELY BUFFER THE AQUIFERS FROM TOXIC CONTAMINATION? THE EIS DOES NOT DISCUSS THIS. IN ORDER TO PROTECT THE HYDROLOGIC INTEGRITY OF LOCAL GROUNDWATER SYSTEMS, THE STATE MUST REQUIRE THAT THESE AQUIFERS BE PROTECTED.

H RECLAMATION RESEARCH HAS SHOWN A DIRECT CORRELATION BETWEEN SOIL DEPTH AND REVEGETATION PRODUCTIVITY.

E Montco has revised its plans for handling overburden. Only favorable overburden would be salvaged for the rootzone. Moderately favorable and unfavorable material would be buried below the rootzone. The only trace element that may be a potential problem is molybdenum, primarily in the South Gate unit. See chapter III, Geology, Overburden, where Montco's current plan is fully explained.

F Please see chapter III, Geology, Overburden, which discusses Montco's revised overburden handling plans.

G Nowhere in southeastern Montana's coal fields has spoil ground water been found to be toxic or poisonous; nor is it likely that spoil ground water will ever become toxic. Dissolved solids concentrations, however, may become high enough that spoil ground water would be unpotable.

Montco has not proposed selective replacement of overburden for limiting postmining spoil ground water quality degradation, although the Department could require this if it believes that doing so would be necessary to meet regulatory requirements.

As discussed in the draft, two techniques were used to provide estimates of postmining total dissolved solids (TDS) concentrations in spoil ground water quality at Montco's mine area. The two techniques, Van Voast (1978) and System Technology (1982), both rely on overburden paste extract data obtained from the Montco area. The overburden extract data were grouped: One group represented the upper 20 feet of overburden; another, the 40 feet of overburden above the coal; and the third, all the overburden down to the coal. (See the draft, app. 7.) The estimated dissolved solids concentrations for postmining spoil water would range from 2,700 to 11,000 mg/l.

Premining overburden water quality in the Montco area is poor. Very high concentrations of dissolved solids, sulfate, and chloride prohibit the use of this water for drinking, irrigation, or stockwatering (Montco, 1983, vol. 12, app. Bc). Further, acceptable alternative ground water supplies have been identified in the Tullock Member of the Fort Union Formation and the Hell Creek Formation, both of which underlie the coal to be mined.

Although it is expected that spoil ground water quality may be inferior to undisturbed overburden water quality, it does not necessarily follow that (1) present ground-water-bearing zones in the Montco area are significant water-bearing units; and (2) unaffected, good quality ground water supplies will be endangered by leachate migrating from spoil. Thus far, all predictions concerning postmining water quality impacts in southeastern Montana have been based on calculations that assume the worst of circumstances.

H Montco no longer plans to salvage some unfavorable soil along with the favorable material.

The use of scoria is discussed in greater detail in the final EIS as a result of recent research by Montco. See chapter III, Soils, and letter 48, answer M.

HEARING TESTIMONY 8

COMMENTS OF ART HAYES JR. 6/3/1982

THE EIS POINTS OUT THAT THE AVAILABLE SOIL FOR SALVAGE IS FAR LESS THAN OPTIMAL. THE 12 TO 17 INCHES DISCUSSED INCLUDES SUBSOIL MATERIALS THAT MAY BE UNFAVORABLE TO REVEGETATION. WHEN YOU CONSIDER THE QUALITY AND DEPTH OF THE SURFACE SOILS, THE NATURE OF THE OVERBURDEN BECOMES INCREASINGLY IMPORTANT. MONTCO ALSO PROPOSES TO USE SCORIA AS A FAVORABLE OVERBURDEN MATERIAL. SCORIA, HOWEVER, TENDS TO BE IN COURSE FRAGMENTS AND ITS USE COULD LEAD TO LOSS OF SOIL THROUGH CRACKS CAUSED BY PIPING. WHEN YOU ARE DEALING WITH ONLY 12 TO 17 INCHES OF QUESTIONABLE SOIL MATERIAL, ANY LOSS OF SOIL COULD HAVE A MAJOR IMPACT ON RECLAMATION SUCCESS.

I THE TRACE ELEMENT SELENIUM IS IMPORTANT IN REGARD TO ANIMAL TOXICITY. MONTCO'S DATA INDICATES NO APPRECIABLE AMOUNTS OF SELENIUM PRESENT. I THINK THIS MAY BE DUE TO THE METHOD USED FOR TESTING. I REQUEST THAT FURTHER TESTING BE DONE USING AN ACID OR A BASE EXTRACT AS OPPOSED TO A WATER SOLUABLE ONE.

I See letter 48, answer J.

J I'D LIKE TO QUESTION ANOTHER STATEMENT IN THE EIS. THE DOCUMENT STATES THAT "BASED ON MONTCO'S PROPOSED RECLAMATION PLAN, COMPLETE REVEGETATION FAILURE IS UNLIKELY." THIS IS NOT REASSURING! ARE WE TO INFER THAT (A) PARTIAL FAILURE IS LIKELY? OR (B) THAT COMPLETE FAILURE, THOUGH UNLIKELY, IS POSSIBLE?
IF THERE WAS A REVEGATATION FAILURE, WHERE WOULD MONTCO FIND THE NECESSARY OVERBURDEN TO MITIGATE SUCH A FAILURE?

J Please see chapter III, Vegetation, which clarifies the impacts expected. Montco could be required to repair any areas where revegetation is not successful. Enough favorable overburden is available in the North King unit for adequate reclamation. See chapter III.

K THE EIS HIGHLIGHTS SEVERAL MAJOR OBSTACLES TO RECLAMATION SUCCESS: SHALLOW SOILS, HIGH SODIUM AND SAR VALUES, SALT PROBLEMS, COURSE AND UNFAVORABLE OVERBURDEN AND TOXIC TRACE ELEMENTS. ANY ONE OF THESE COULD PREVENT SUCCESSFUL RECLAMATION. COMBINED THEY PRESENT AN IMPROBABLE IF NOT IMPOSSIBLE BARRIER TO SUCCESSFUL RECLAMATION.

K Please see revisions in chapter III, Geology, Soils, and Vegetation. The difficulties presented in the draft EIS do not make reclamation impossible.

HEARING TESTIMONY 8

COMMENTS OF ART HAYES JR. 6/3/1982

COMPANY AND STATE ACCEPTANCE OF UNDESIRABLE SURFACE SOIL MATERIAL FOR USE IN RECLAMATION IS CONTRARY TO THE INTENT IF NOT THE WORDING OF STATE REGULATIONS.

L IF SUITABLE GROWTH MATERIALS CANNOT BE ISOLATED FROM OTHER MATERIALS DURING MINING, WHICH IS THE CASE HERE, THEN RECLAMATION SUCCESS IS DOUBTFUL, AND RECLAMATION CONSISTANT WITH THE REQUIREMENTS OF THE MONTANA STRIP MINE ACT IS NOT POSSIBLE.

THANK YOU,

ART HAYES JR.

L Suitable materials can in fact be isolated from unsuitable materials. See chapter III.

HEARING TESTIMONY 9

Keith Powell:

My name is Keith Powell. I'm a rancher and irrigator in the lower Tongue River Valley.

A I think the most important--most basic--question to be considered here for the state of Montana, for the nation, is the need for this mine. I think it is ridiculous that the need for the coal isn't the first issue. My concern is that this project could be started and then go belly up. Construction could start and condemnation could take place to build the railbed based on some subcontract.

The daily news provides a variety of examples of quick boom situation. Exxon's Colony oil shale project in Colorado was recently written off because costs have more than doubled. It was their decision to cut their losses. With the absence of a market or any likely market over the next 20 years, it was financially a very poor venture. Over 2,000 people were laid off overnight. Occidental Petroleum and Tenneco delayed their shale development near Cathedral Bluffs. Gulf and Standard Oil have put off commercial development at Rio Blanca, Colorado.

B Bonneville Power Administration recently received a consultant's report that predicts a much lower growth rate of electrical consumption in the Northwest. This report, made by Energy Ventures Analysis Inc., says Northwest demands for electricity will remain flat for the 80s and have an annual growth rate of 1.2 percent through the early 1990s. This consulting firm's report also states that rapidly escalating prices will result in major conservation by energy users. The firm goes on to say, if power use levels off, planned and partially completed nuclear plants may not be necessary.

Certainly, the evidence of overly optimistic projections of energy use has resulted in extremely excessive increases in electrical costs to power users of the area. It is quite apparent that the bust could come here, too. These projects were born in the same era. Their failure is not so much the result of a weak economy, but instead the result of unrealistic and poorly planned efforts to supply energy.

C The assumption seems to be that if investors are willing to put up the money for the development, they should be allowed to measure and take their risks and be subject to the economy. If the project fails, their loss. This argument doesn't work here.

Strip mine sitings are a public issue, not a private one. The long list of serious and costly impacts of soils, water, education, housing, community services, and local government put Montco Mine issues squarely in the center of public policy. Impact issues are issues for the people of Montana and the Tongue River Basin, not Diamond Shamrock Corporation or the Western Energy Company. Certainly the opening of 4 or 5 mines in the area and the construction and operation of 90-mile railroad in the valley are extremely incompatible with the basic foundation industry of Montana.

D Montana reclamation laws provide 7 reasons for which the Department of State Lands can deny the permit. These conditions are present throughout the mine area. Impacts on ground water are not clear: Aquifer areas apparently

A See testimony 2, answer A. The possible failure of the Montco Mine has been considered at various times by the Department's staff. It was not included in the draft EIS because of its low probability. Unlike the synthetic fuel ventures you mention, the Montco Mine would probably have to have a firm sales commitment in hand before starting construction. Thus it is subject to a great deal less risk of sudden fluctuations because of unforeseen market changes. In any case, appendix 9 has been added to describe the effects of failure.

B Thank you for your comments.

C Strip-mine siting is a public issue only in the sense that the company must comply with State and Federal law. After receiving a permit, the company alone decides if and when to open the mine. Neither the public nor the Department is involved.

D Analyses of postmining spoil ground water quality assumed the worst of circumstances. Thus, it is highly unlikely that ground water quality would be degraded "even more than expected." See also testimony 8, answer G.

HEARING TESTIMONY 9

E won't be buffered from unsuitable material, and this could degrade the ground water quality even more than expected. Increased industrial withdrawals from the Tongue River could result in low flows, much more severe than those modeled, with serious impacts to irrigators.

Similar questions about the severity of impacts and reclamation failure will be raised tonight and in written comments. My point is that the Department of State Lands has many indications that this mine permit should be denied. I think the Department is also aware that the controlling interest in the mine development is held by Diamond Shamrock Corporation. Through its Falcon Coal and Hawkeye Coal subsidaries, Diamond Shamrock has a long history of strip-mine rule violations in the eastern states. Their track record doesn't look good.

F Montana Environmental Policy Act declares that it is the policy of the state in part to foster and promote the general welfare and to fulfill the social and economic and other requirements of present and future generations of Montanans. To carry out this policy, it is essential to address the issues of industrial siting in broad terms and reject the notion of granting permits in a vaccuum. I think, based on the Environmental Policy Act, that the Department of State Lands should address the impacts of the real possibility that this mine and railroad might be built and then go under. In interest of that which is best for Montana, I feel this mine permit should be denied.

Thank you.

E No industrial user now withdraws water from the Tongue River Reservoir or the river below the dam; nor is there any likelihood of such withdrawals. Today's water appropriations for irrigation leave little or no available water for industrial sales, and the Tongue River Reservoir now passes "extra" water through the project. The extra water is not stored for sale because the dam's condition precludes maximum storage in the reservoir.

If and when a new dam and reservoir are constructed, analyses and predictions made for the Tongue River Petition Document (1982) would apply. Relevant analyses made for that document (DSL and OSM, 1982) which resemble Montco's mining plan indicate that neither Tongue River water nor its present water users would be significantly affected.

F See answer A.

HEARING TESTIMONY 10

Bertha Medicine Bull:

Good evening. My name is Bertha Medicine Bull. I'm a direct neighbor of the Nance Mine. I live directly across the river at the Nance Mine.

A I was reading parts of the study, and one of the biggest things that really strikes me is the natural habitat for wildlife would be depleted for 100 years. It would not grow back. One hundred years is a long time. Most of us won't see 100 years.

B The influx of money to the small community of Birney would be detrimental to the social life. The environmental is very fertile, very productive right now. The river--I swim in it every summer--it's still clean. It's not massively polluted. I would like future generations to enjoy that kind of pristine quality of life which I've been able to enjoy.

C It's not that we are against development as a whole. I think that, if anything is to be done, I think that each and every opinion of people that are going to be affected should be heard. Like I wasn't even asked if it was okay, and I live directly across the river. Perhaps in the future I will want to use the water. I think that it should be denied.

D I have a grandmother who passed away in 1980, and she wanted me to relay a message, or help her relay this message, that before the reservation boundary was born the river east of the Tongue River from the mine, and possibly all the way down to Miles City, was original Cheyenne country. The term she used is, if you translate it into English, is they cheated us. Her father was one of them that was asked to move across the river for 5 years in lieu of $25, which some families took payment in coffee or sugar. Today we find out that coffee causes all kinds of diseases. Sugar causes sugar diabetes. What kind of payment is that for all that acreage which is still producing cattle? The ranchers are producing healthy food for their families.

Everyone is still breathing clean, fresh air. I've been through cities like Tacoma, Washington, or gone through Denver, and I've seen the pollution. So if it were to ever go in, it would be like living directly across from Colstrip. I don't think I'm ready to live in that kind of an environment, if I can help, because there's no other place in the world we can go to. You can't call it home but anywhere else but here. I'm speaking my opinion of the quality of life that I would like to receive for myself and my neighbors. I don't know too many of you, but someday, like Gail said, we'll have to find some kind of coalition to find it.

Thank you for your time.

A The revised wildlife summary (used in both the Summary and Wildlife sections) no longer includes the 100-year figure. Although replanted conifers would take decades to mature, revegetation would provide food and/or cover for most animals.

B Thank you for your comments.

C Thank you for your comments.

D Thank you for your comments.

HEARING TESTIMONY 11

A A draft EIS isn't supposed to be a final statement, but this draft was prepared out of some exceedingly under-ripe information. We are somehow supposed to make some sort of intelligent evaluation at the time we"await additional data", if I ma take a few words out of the draft.

I have some questions for Montco that might give some perspective to the total situation. In the light of my questions for Montco, I then have a question for DSL.

I'd like to point out to you Montco folks that even if you could find a market for the coal, you're looking at some financially tough hoops to jump through. I'm surprised you didn't plan for something as basic in the regs as containment of drainage water on the minesite. And, apparently you didn't consider the necessity to sort favorable and unfavorable overburden into at least two piles while mining, nor the personnel, time and equipment needed to do that.

Have you considered the man- and machine-hours it would take for the special topsoiling and revegetation techniques to avoid part of the erosion on necessarily steep slopes? This is mentioned on page III-1. Or have you considered the cost of regularly repairing the erosion that is bound to develop anyway? Take a look at Pit 6 at Colstrip to see what you're in for. Or the cost of trying to repair the piping on the flatter places? Page III-3 points out that it can be severe and long term. Montco's spoils would lend itself to this problem. Or how about the cost of replacing the bare spots (the pockets of toxic material that won't grow vegetation) with favorable material, and revegetating these spots? This is discussed on page III-28.

As mining proceeded southward, what would you do if you core-sampled those other mining units enough to find out that the soil is too poor to make reclamation feasible, thereby eliminating hoped-for mining permits? Are you willing to gamble that you can pay for your investment before that time? I believe the term "gamble" fits this situation better than "high risk". How about the damage your railroad would do to so many ranches down the Tongue River if you had to fold up your operation? Would you be willing to return their land to pre-railroad condition if they paid you back the amount they were paid for the land?

Of course, many of these questions are just academic if you can't find a buyer for your coal. Some of the existing mines are scratching to keep up with their financial obligations at this time. I keep thinking about you people facing the same problems, with the additional costs of acquiring machinery and setting up facilities. Added to this is the timing of getting your railroad built in time to coordinate with when you would be ready to mine. You don't know how long it will take to acquire a right-of-way through good land that people don't intend to lose to a gamble such as yours.

B I have this Question for DSL: If you grant the permit, are you prepared to handle the furor generated from all this impact if the whole scheme goes belly-up?

C In this draft EIS they have not even begun to demonstrate affirmatively that the proposed mining area is reclaimable. On the contrary, this draft points out a wide variety of soils problems that may be possible to handle separately. However, these problems become insurmountably complex when they add together in the actual mining followed by attempts at reclamation.

The draft statement brings to light many very real problems that would occur in revegetation attempts. Considerable mention is made of trying to buffer the

D too-thin topsoil and rootzones with favorable soils. If there is any mention of buffering any re-establishing aquifers, I missed seeing it. Perhaps there isn't enough favorable material to buffer both the rootzones and the aquifers. In spite of what the draft seems to say, I hope DSL isn't forgetting the necessity of keeping aquifer water separated from toxic soil. Stripmining has already created enough hydrologic time bombs without starting from scratch to create more.

E The draft Lands Unsuitability Petition for this area contained some rational sounding statements that painted a rather severe picture of some problems associated with hydrology. This draft EIS paints a picture 180° from that. Things sure did heal up in short order on that. Will new evidence or opinions change it another 180°? Or 90°? If and when the time bomb comes to light, how able is DSL to defend the stance taken on hydrology in this draft?

A We assume you are quoting the last sentence on page II-15 of the draft. As stated just before the quoted material, the Department has identified no areas in Montco's North King mining unit as being in the Tongue River alluvial valley floor. A determination has not been made for the parts of the valley near other mining units in the life-of-mine plan. When and if Montco applies for permits for other units, the Department will redefine the geographic area and require additional information on the Tongue River alluvial valley floor. (See also testimony 1, answer A.)

B The job of the Department is to administer the reclamation laws and regulations of the state of Montana. The Department cannot speculate about, or base a permit decision on, the profitability of the mine. We can only assume that Montco would not open the mine if the company's analysis showed the operation would fail.

C Montco has revised its reclamation plan. See revised text in chapter III, Geology (Overburden), Soils, and Vegetation.

D Your comment is noted. Please refer to testimony 8, answer G.

E We are unaware of the contradictions you refer to. The analysis of the hydrology in the Montco area summarized in the draft was completed utilizing state-of-the-art techniques. These techniques used the current bank of knowledge and represent specific interpretations of the present hydrologic system, as well as postulated postmining conditions. If pertinent new technology is developed and becomes available, the methods and models used in the draft will be appropriately refined to reflect these technological advances. In this manner, the Department has and will continue to defend its analysis of hydrologic conditions and potential effects by mining activities.

HEARING TESTIMONY 11

-2-

F G The North King mining unit looks like a foot in the door to cause DSL to yield to granting later permits on successive mining units to the south. With only five drill holes in South King and two in North O'Dell, there is essentially very little information on whether or not the land is reclaimable. There are far too many unknown factors. South King tentatively is marginal for revegetation, but it may be possible, depending on what the rest of it looks like if it is core sampled. It might go either way. North O'Dell with 93% of their two samples showing an SAR of 35.2 (over 20 is classed unfavorable), and other readings also far too high, looks impossible to revegetate or buffer re-establishing aquifers.

H If North King is being used as a foot in the political door for any or all of the others, let's talk about it. Apparently five drill holes had a lot of scoria. It shows up pretty good in the tests and made the averages on the rest of the unit look more respectable. I think it is worth noting that the areas of my yard that are underlain by scoria will grow plants and probably would test out well. But, a good water source is a necessity because plants burn rapidly without very regular watering. So, perhaps the western part of North King mining unit would grow plants if irrigated regularly.

I The 13 holes in the rest of the unit had an SAR average of 22; 50% of all the samples had 35.5 for SAR. Remember, 20 is unfavorable. It sounds like some very detailed special handling of this would be in order. North King is a very weak-sounding foot in the door.

J Can Montco affirmatively demonstrate to the Department that the proposed mining area is reclaimable? I have only touched on part of the problems, but I believe DSL would be very hard pressed to defend granting Montco a permit.

R.P.A.

F Should Montco receive a permit and open the mine, the same stringent regulations would apply to future mining units as apply to the North King unit. The opening of the mine does not preclude denial of future permits.

G Although limited data suggest the presence of unfavorable overburden in the areas you mention, the Department's current permit decision must be made for Montco's permit application for the North King unit. See also testimony 8, answer G.

H Your comments are noted.

I Montco's revised reclamation plan does in fact call for detailed special handling using the favorable overburden isopach maps mentioned in the draft EIS. See chapter III, Geology, Overburden, for an explanation of the current plan.

J Montco, in an effort to demonstrate that the mine can be reclaimed, has revised its overburden handling plan since publication of the draft. Please see revisions in chapter III under Geology, Soils, and Vegetation.

HEARING TESTIMONY 12

TESTIMONY ON
THE MAY 1982 DRAFT
ENVIRONMENTAL IMPACT
STATEMENT FOR THE PROPOSED
MONTCO MINE, ROSEBUD COUNTY, MONTANA
-AS PRESENTED, IN BEHALF OF THE
NORTHERN CHEYENNE TRIBAL COUNCIL AND PRESIDENT
BY GEORGE HIWALKER, JR., VICE-PRESIDENT OF
THE NORTHERN CHEYENNE TRIBE.
- JUNE 3, 1982 -
IN
ASHLAND, MONTANA

MY NAME IS GEORGE HIWALKER, JR. AS VICE-PRESIDENT OF THE NORTHERN CHEYENNE TRIBE OF THE NORTHERN CHEYENNE INDIAN RESERVATION I WISH TO PRESENT AND SUBMIT FOR AND BEHALF OF THE NORTHERN CHEYENNE TRIBAL COUNCIL AND PRESIDENT THE FOLLOWING COMMENTS CONCERNING THE MAY 5, 1982 MONTCO MINE DRAFT EIS, A PROPOSED MINING ACTION, AND WISH A TO PREMISE MY COMMENTS ON THE UNDERSTANDING THAT BECAUSE THE MONTCO APPLICATION IS INCOMPLETE (REFER TO 2ND LETTER OF DEFICIENCY ISSUED BY MONTANA DEPARTMENT OF STATE LANDS TO MONTCO IN ~~APRIL~~ MAY, 1982), THE NORTHERN CHEYENNE TRIBE MUST CONSIDER THE DRAFT EIS INCOMPLETE, AS PRESENTED. HENCEFORTH, I SHALL CONFINE COMMENTS TO THAT DATA PRESENTED IN THE MAY 12 EIS, AND ASSUME THAT THE REQUESTED PERMITTING ACTION SHALL NOT OCCUR UNTIL FURTHER APPLICATION DEFICIENCIES ARE REMEDIED AND BROUGHT FORWARD FOR PUBLIC COMMENT.

B FIRST AND FORMOST, THE DRAFT EIS IS TECHNICALLY UNCLEAR CONCERNING THE LOOSE-INTERCHANGE BETWEEN THE PROPOSED SITE-SPECIFIC PERMIT AREA

A See testimony 1 answer A.

B We agree that the impacts that would result from life-of-mine and cumulative scenario development are often described generally. The descrip-

HEARING TESTIMONY 12

Testimony by George Walker, Jr.
June 3, 1982

(North King Unit) and the proposed 5 pit Montco Mine in relationship to the overall description of the immediate study area, the proposed total mining action, the identification and assessment of all environmental and social impacts, and proposed mitigation measures required to minimize these impacts.

For example, the North King Mining Unit clearly will not support the construction of a railroad as proposed and required to service the Montco Mine. Yet, the loose interchange between specific permit area information and what information is available for the entire mining area is unquestionably too general in relationship to the discussion of cumulative effects and impacts. And it is reasonable to assume that additional environmental and socio-economic data are required concerning the entire mining area in order to reasonably interface the permit area discussion with the general intent of the overall mining plan. I am therefore suggesting that the EIS confine information and data to the permit area only, or propose specific and definitive data about the entire mining area in valid relationship to the specific permit area data.

C A second major concern in the EIS which I must call attention to is that of obvious environmental deficiencies inherent in the overall mining plan proposed for the North King Unit. Chapter III-5-6 (Overburden) clearly suggests that "seperation of favorable from unfavorable materials may present some problems. Although Montco's selective overburden handling plans would aid in this seperation process, inherent errors in this process could allow some unfavorable overburden to be placed in the rootzone." As the discussion progresses

D in this chapter concerning "Montco's overburden handling plans, I am

tions are also briefer under some topics than others. Nonetheless, we feel that the EIS amply discloses the range of problems that might beset the project over the long term.

Confining the EIS to only the permit area would be ignoring the long term. Expanding the EIS to cover the life-of-mine plan and cumulative scenario in greater detail would be impossible with the data available. Present laws do not require companies to prepare and submit detailed plans and information for the life of the mine. The EIS includes a discussion of impacts only when enough information has been available to confidently reach reasonable conclusions.

C Montco has revised its overburden handling plans. (See Chapter I and Chapter III, Geology.)

D Your comment is noted.

TESTIMONY BY GEORGE ''IWALKER, JR.
JUNE 3, 1982

DISTURBED TO REFLECT ON THE FACT THAT ONLY ONE (1) STOCKPILE FOR OVERBURDEN TO BE DOMINANT FOR A 6 YEAR PERIOD, IS CALLED FOR IN THE MINING PLAN. E I AM EXTREMELY PERPLEXED WITH THE FACT THAT THE OVERBURDEN HANDLING DISCUSSIONS CONTINUE AND EXTEND INTO THE OTHER PROPOSED MONTCO MINING AREAS, YET, CORE SAMPLING DATA IS OBVIOUSLY INCOMPLETE AND CAN NOT REASONABLY DEFINE IF FAVORABLE RECLAMATION MATERIALS EXIST AND TO WHAT EXTENT. YET, THERE, AGAIN, IS LOOSE INTERCHANGE BETWEEN THE PERMIT AREA REQUEST AND WHAT IS REQUIRED FOR AN OVERALL, ECONOMICALLY VIABLE MINING AREA. F THESE SAME INHERENT DEFICIENCES CARRY FORWARD TO CHAPTER III.B.2.A AS SURFACE WATER, SEDIMENT AND RUNOFF IS ADDRESSED. I QUOTE: "DEPARTMENT ADMINISTRATIVE RULES (ARM 26.4633) REQUIRE THAT SURFACE RUNOFF FROM ALL DISTURBED AREAS BE ROUTED THROUGH SEDIMENT PONDS. BECAUSE MONTCO HAS SUBMITTED A SURFACE DRAINAGE CONTROL PLAN FOR THE NORTH KING UNIT (FIG. 1-5) THAT WOULD ALLOW MAJOR AREAS OF DISTURBED SURFACE TO DRAIN UNCONTROLLED OFF THE PERMIT AREA DURING MINING, RUNOFF AND SEDIMENT COULD DISCHARGE DOWNSLOPE OR DOWNSTREAM, BEYOND THE PERMIT BOUNDARY. SIMILARLY, MONTCO HAS PROPOSED SURFACE DRAINAGE CONTROL FOR NEITHER THE SURFACE FACILITIES AREAS NOR MUCH OF THE POSTMINING SURFACE.

RUNOFF FROM ALL SURFACES IN THE REGION OCCURS ONLY IN RESPONSE TO RAINSTORMS AND SPRING SNOWMELT, THE TIMING AND INTENSITY OF WHICH ARE LARGELY UNPREDICATBLE. RUNOFF EVENTS MAY OCCUR FREQUENTLY IN A GIVEN YEAR, OR MAY NOT OCCUR AT ALL. NONETHELESS, MONTCO HAS NOT PROPOSED SURFACE DRAINAGE CONTROL FOR MAJOR AREAS OF ITS MINE AND IT MUST BE ASSUMED THAT RUNOFF COULD OCCUR AT ANY TIME, DURING WHICH THESE SURFACE AREAS ARE DISTURBED. ACCORDINGLY, THE DEPARTMENT CANNOT ISSUE A SURFACE MINING PERMIT UNLESS AND UNTIL MONTCO REVISES ITS SURFACE

E See answers B and C.

F Montco has revised its surface drainage plan. See testimony 3, answer A.

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Testimony by George Hiwalker, Jr.
June 3, 1982

drainage control plan to include all disturbed areas.

The remainder of Montco's mine plan area would be affected similarly by the same Department rule. However, no assessment of drainage control plan adequacy can be made until Montco submits future mine plans."

I can only conclude from this discussion that Montco has obviously given little if any consideration to surface drainage control for the permit area, least of all the entire mining area. G I am, also, disturbed by the discussion of Dissolved solids loads in the Tongue River, Chapter III.B.b., in that localized cumulative effects of solid waste disposal in the Tongue River are not clearly identified nor reiterated. Because the Northern Cheyenne Tribe has a very significant, vested interest in the Tongue River, it is imperative that these localized effects be clearly defined if Montco is to proceed with its proposed mining plan. And, certainly, a Tongue River water code may be required in order to effectively ensure the preservation and quality of these waters, as major mining proposals are further developed. Because specific, localized, hydrologic impacts are seemingly vague, the Northern Cheyenne Tribe will further study and assess this portion of the EIS discussion on cumulative hydrologic impacts and present its findings at a later and timely date.

H As enrivonmental discussions continue in Chapter III.C. concerning soils impacts to the permit and mining area it is evident that reclamation and revegetation of the permit area will require several decades and may literally be impossible if unfavorable materials are left at or near the surface. I I, also, call attention to the fact that soil sample data taken from the North King unit is limited to one or two samples on or near the actual permit area. Although, soil sampling

G Your comment is noted. Present cumulative solid waste contributions to the Tongue River are reflected in the historic water quality records summarized in the EIS (draft and final). Impacts of future contributions from solid waste disposal sites will be insignificant. Montco is required by ARM 26.4.507 to place and store all solid waste in a controlled manner in a designated portion of the permit area. Placement and storage shall ensure that leachate and surface runoff do not degrade surface or ground water. Montco has committed to handling all solid waste in a manner acceptable to and approved by the Rosebud County Sanitarian and the Montana Department of Health and Environmental Sciences.

H Comment noted.

I Montco has revised its soil salvage plan using all sample data submitted for the entire mine plan area. See chapter III, Soils, where the current plan is analyzed.

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TESTIMONY BY GEORGE HIWALKER, JR.
JUNE 3, 1982

DATA WAS INTENDED TO REPRESENT THE ENTIRE MINING AREA, IT IS DIFFICULT TO CONCEIVE THAT A SUCCESSFUL RECLAMATION PLAN IS IN PLACE FOR THE PROPOSED PERMIT AREA. AGAIN, THIS LOOSE INTERCHANGE BETWEEN THE PERMIT AREA DATA IS INCONCLUSIVE AND DOES NOT PRESENT A CLEAR NOR ACCURATE J PICTURE ON REQUIRED RECLAMATION PROCEDURES FOR THE PERMIT AREA. AN ADDITIONAL ENVIRONMENTAL CONCERN OF THE NORTHERN CHEYENNE TRIBE IS THAT OF EMISSIONS FROM FAS 566, AIR QUALITY, CHAPTER III.H.3. I QUOTE: "THE MAJOR SOURCE OF PARTICULATE EMISSIONS ASSOCIATED WITH THE MINE WOULD BE TRAFFIC ON FAS 566, THE GRAVEL ROAD FROM ASHLAND TO THE MINESITE. ASSUMING 330 LIGHT DUTY VEHICLES AND TEN HEAVY-DUTY VEHICLES (SAI, 1981) MAKE THE 11-MILE ROUND TRIP DAILY, ANNUAL PARTICULATE EMISSIONS WOULD TOTAL ABOUT 3,350 TONS PER YEAR (MONTANA DEPARTMENT OF STATE LANDS, ON-FILE REPORT, 1981), COMPARED WITH 1,620 TONS OF PARTICULATE FROM ALL OTHER MINING ACTIVITIES. THE AIR QUALITY MODELING DONE BY SAI (1981) FAILS TO INCLUDE THE GRAVEL ROAD AS A SOURCE AND THEREFORE SUBSTANTIALLY UNDERESTIMATES THE INCREASE IN TSP CONCENTRATIONS. WITH THE GRAVEL ROAD INCLUDED, THE PRIMARY FEDERAL AND MONTANA AMBIENT AIR QUALITY STANDARDS WOULD PROBABLY BE EXCEEDED OUTSIDE THE PROPOSED PERMIT AREA BOUNDARY."

THOUGH IT IS CONCLUDED THAT THE SLIGHT INCREASE OF TSP CONCENTRATIONS WOULD NOT CONSUME THE CLASS I INCREMENT, THE DATA IS CONFINED TO ONLY THE PERMIT AREA, YET, DOES NOT ATTEMPT TO ADDRESS CUMULATIVE AIR QUALITY IMPACTS IF THE ENTIRE MINING AREA IS OPERABLE. IT IS INTERESTING TO NOTE THAT THIS PARTICULAR ENVIRONMENTAL DISCUSSION IS ISOLATED ONLY TO THE PERMIT AREA, WHEREAS, OTHER IDENTIFIED ENVIRONMENTAL CONCERNS HAVE COMMONLY EXCHANGED DATA BETWEEN THE PERMIT AREA AND THE OVERALL MINING PLAN.

J As stated on pages III-36 and III-37, TSP concentrations and particulate emissions were estimated for the year of maximum coal production (12 million tons) and maximum surface disturbance. During that year the "entire mine would be operable," and the TSP concentrations would be highest. Particulate emissions from FAS 566 and changes in the Ashland air quality are discussed. Thus, the discussion is not limited to only the permit area.

Since the public would not have free access to the proposed permit area, the ambient air quality standards could be exceeded in the permit area and an air quality permit could still be granted. The permit area boundary is used in the discussion because the standards apply only outside the boundary.

HEARING TESTIMONY 12

Testimony by George Hiwalker, Jr.
June 3, 1982

K My final comments on the Montco EIS shall be confined to the unquestionable social and economic impacts which will effect the Northern Cheyenne Indian Reservation as created by the proposed mine. In my opinion serious and fatal flaws exist in the social and economic discussions of the EIS in that it is assumed that population influxes to the reservation area shall not occur with the permit action and that reservation economic impact is discussed only in terms of minimal tribal employment to be gained with the proposed mining operation. I attribute these fatal assumptions to the fact that no socio-economic model exists for the reservation area and that the model brought forward to the EIS can not conclusively achieve a fair assessment of these unquestionable reservation degradations.

K The EIS does not say that there would be no population in-migration to the "reservation area," only that these new residents are not likely to reside on the reservation. The assumption about residence patterns is based on employee composition information, Colstrip construction schedules, current residential patterns, the transportation network, and the availability of housing, housing development space, and services. Note that the Northern Cheyenne Planning Office (table 19, of their Western Analysis Final Report, Aug. 29, 1981) concurs with our conclusions.

I call your attention to the following conclusions as presented in Chapters II and III of the EIS:

L 1. Though the Northern Cheyenne Reservation is the most densely populated area within the study area, only 15% of the required Montco labor force shall be derived from the tribal work force. The assumption is made that this 15% shall constitute the residential distribution of the tribal labor force.

L Comment noted.

M 2. Though the employment discussions identify the tribal government as the major employer of the existing, working tribal labor force, these discussions fail to disclose that roughly 300 Northern Cheyenne tribal members have been employed at the Colstrip project expansion, that 200 of these persons are now employed at the Project, that roughly 150 of these persons shall be Union certified at the closing of the construction cycle, (1984), that the Colstrip Project, Northern Cheyenne labor force

M Comment noted. Thank you for this information.

TESTIMONY BY GEORGE HIWALKER, JR.
JUNE 3, 1982

HAS EXCEEDED ALL EXPECTATIONS OF COMPETENCY AND RELIABILITY IN CONTRAST TO OTHER NON-INDIAN LABOR FORCES, AND THAT SUCH TRIBAL EMPLOYMENT EXCELLENCE WAS ACHIEVED DUE TO IMPOSED CONDITIONS ON CONSTRUCTION PERMITS.	
N 3. THOUGH COMMUNITY SERVICES ARE IDENTIFIED AND DISCUSSED IN THOSE TOWNS EFFECTED AND SURROUNDING THE MINING PLAN AREA, THE RESERVATION IS OMITTED FROM THIS PRESENTATION OF FACTS AND SUBSEQUENT IMPACTS CONSIDERATIONS;	N See changes in text, Chapter II, Community Services (new section) and additions to Chapter III, Community Services.
O 4. THOUGH FISCAL DATA AND IMPACTS CONSIDERATIONS ARE PRESENTED AND DISCUSSED FOR ALL COMMUNITIES SURROUNDING THE MINING ACTION, THE RESERVATION FISCAL DATA IS CLEARLY OMITTED. HENCEFORTH, IT IS CONCLUDED THAT THE NORTHERN CHEYENNE FISCAL CONDITION WOULD NOT BE AFFECTED BECAUSE IT IS ASSUMED THAT THE MINE WILL NOT CAUSE POPULATION INCREASES. CUMULATIVE EFFECTS ON THE RESERVATION ARE AGAIN OMITTED;	O The reservation was not omitted. (See Chapter III, Fiscal, section 6.) The proposed action would not significantly affect the fiscal conditions of the Northern Cheyenne Reservation. Because there would be no identifiable impact, the existing fiscal conditions were not described.
P 5. THOUGH POPULATION INCREASES ARE PROJECTED FOR ASHLAND, BIRNEY, COLSTRIP, AND FORSYTH, THE DATA FAILS TO RECOGNIZE THAT PORTIONS OF THE ENTIRE ASHLAND AND BIRNEY COMMUNITIES ARE SITUATED ON THE RESERVATION AND THAT POPULATION CHANGES WILL MOST PROBABLY OCCUR ON THE RESERVATION IN THAT THE MINE IS LESS THAT 1/8 OF A MILE FROM THE EASTERN RESERVATION BOUNDARY;	P See answer K.
Q 6. THOUGH RESERVATION-BASED ROADS FACILITIES ARE RECOGNIZED AS VITAL TO THE PROPOSED MINING OPERATION, LITTLE IF NO ATTENTION IS GIVEN TO THE FACT THAT RESERVATION COMMUNITY FACILITIES AND SERVICES SHALL BE IMPACTED AS ROAD TRAFFIC SIGNIFICANTLY INCREASES.	Q See answer N.

HEARING TESTIMONY 12

Testimony by George Hiwalker, Jr.
June 3, 1982

R It is obvious and likely that the reservation population will change as non-Indian labor forces move into the area, that on-reservation services and facilities will be effected and demanded by the associated population influx, that sociological concerns of the Tribe will be affected, yet the fiscal condition of the Tribe and reservation area are not identified, adequately discussed, nor afforded mention as to "how" the Northern Cheyenne Tribe will financially cope with the additional maintenance requirements necessary for impacts mitigation.

R For comments about population change, see testimony 13, answer K, and about services and facilities see testimony 12, answer N.

Because neither the proposed action nor the cumulative scenario would significantly affect the fiscal condition of the tribe, the current fiscal condition is not described. We were unable to identify any additional maintenance requirements that the tribe would have to cope with as a result of either the proposed Montco mine or cumulative mine development.

S I further support this argument with a letter of appeal forwarded by the Northern Cheyenne Tribe to Secretary Watt on March 19, 1982 requesting administrative action to delay the Northern Powder River Federal Coal Sale: "It is well known that economic standards prevailing on the Reservation are substantially depressed from those which otherwise prevail in Rosebud and Big Horn Counties. This is so with respect to the relative economic circumstances of individuals residing on and off the Reservation and, even more significantly for present purposes, with respect to the comparative economic resources of Tribal government and county and town governments. In marked contrast to adjoining off-Reservation jurisdictions, the Northern Cheyenne Reservation traditionalll and currently lacks a tax base from which adequate governmental revenue may be generated. Thus, from the outset, the Northern Cheyenne Tribal government will be substantially less capable economically than its Off-Reservation non-Indian counterparts to cope with the economic burdens which enhanced development will inflict on units of local government. Yet, this is neither recognized nor discussed in the FEIS and Tract profiles.

S See testimony 6, answer I.

And, most importantly in the present circumstances, the financial

HEARING TESTIMONY 12

Testimony by George Hiwalker, Jr.
June 3, 1982

programs under State and Federal law that are specifically designed to provide funds to State, County and local governments to mitigate the costs of coal development impacts are simply not made available to the Tribe. Thus, as development is implemented, while affected off-Reservation communities will have access to substantial federal and state funds to mitigate forecasted impacts, the Tribe will have no access to such funds. However, this is not acknowledged or analyzed in the FEIS and Tract profiles."

T In a subsequent letter forwarded to Secretary Watt on April 1, 1982 the Northern Cheyenne Tribe outlined its' major impact concerns which included Mitigation Funding, Law and Order, Traffic, Employment Preferences, and Adequate Assurances. It suggested that these concerns could be adequately minimized if conditions were stipulated on the federal coal leases, thereby, curtailing the obvious negative impacts affecting the Northern Cheyenne Reservation as the Northern Powder River Coal reserves are further developed.

These same tribal concerns are applicable to the proposed Montco permit action even though State jurisdictions supercede federal authorities.to further clarify this point, I call your attention to the September, 1981 Tongue River Valley Unsuitability Petition Hearing conducted in Ashland, Montana. The Northern Cheyenne Tribe, on written record, opposed the Petition with the understanding that reservation impact concerns must be addressed and adequately minimized if future coal development actions were to commence as planned.

U The May 5th, 1982 Draft Environmental Impact Statement for the Montco Mine fails to adequately identify these major socio-economic impact concerns for the reservation area, least of all propose adequate

T Comment noted.

U For identification of "socio-economic impact concerns" see answer N. Two mitigation measures are given on pages IV-6 and IV-7 of the draft which are directed specifically toward the Northern Cheyenne. Other measures apply to both Indian and non-Indian populations.

HEARING TESTIMONY 12

Testimony by George Hiwalker, Jr.
June 3, 1982

mitigative measures for these concerns. I therefore, call upon the Montana Department of State Lands to delay permit to the Montco plan, as presented in the May 5th, 1982 EIS and require remedies to all obvious deficiencies before public comment is further solicited.

I shall address all questions at this time and, again, extend my appreciation to you for allowing the Northern Cheyenne Tribe to comment on the proposed mining action.

HEARING TESTIMONY 13

NORTHERN CHEYENNE PLANNING COMMITTEE
NORTHERN CHEYENNE PLANNING OFFICE
P.O. Box 128
LAME DEER, MONTANA 59043
(406) 477-6284 • 477-6703

June 3, 1982

NORTHERN CHEYENNE PLANNING COMMITTEE
Ben Limberhand, Chairman
James Robinson, Vice-Chairman
Daniel Foote, Secretary
Matthew Two Moons, Member
Burt Medicine Bull, Member

ADMINISTRATION DIRECTOR
Duane Hatnenn

ASSISTANT DIRECTOR
Sandra Spang

Commissioner Moon
Department of State Lands
1625 11th Avenue
Helena, Montana

Dear Commissioner Moon:

A II-79, II-80
- map does not point out Lame Deer - Birney Village paved road

B II-78
- ADT (Average Daily Traffic Count) between Lame Deer - Ashland (Highway 212) - has also increased substantially in recent years due to coal development & Colstrip 3 & 4.

C II-87
Cultural Resources - Historic sites - does not mention Buffer Zone on Reservation

IMPACTS

D III-73 & III-42-43
Population of Reservation

E III-79
Montco impacts on Highways is low for reservation roads on the EIS than what Northern Cheyenne Planning Office projected. (Lame Deer - Ashland road)

F III-78
The entire road between Lame Deer - Ashland would need to be rebuilt to handle traffic safely. EIS states it just needs improvement.

G III-80-81-83
Does not mention spirit Rock nor Cheyenne Faces which lie in the Buffer Zone, on the reservation & may be subject to deteriation, by truck vibrations, blasting, etc.
EIS did not mention possibility of locating a major electric power line through the N.E. part of the Northern Cheyenne Reservation.

COMPUTER DEPARTMENT
Herman Bearcomesout, Coordinator

PLANNING DEPARTMENT
Brenda Little Coyote, Coordinator

ECONOMIC DEVELOPMENT DEPARTMENT

RESOURCE AND DATA DEPARTMENT
Doris Limberhand, Coordinator

ENVIRONMENTAL AFFAIRS DEPARTMENT
William Sullivan, Coordinator

A The figures you mention have been revised.

B Thank you for your comments.

C See text change.

D See testimony 12, answer K.

E The traffic projections used in the draft EIS are the best estimates available. They were provided by the firm that did a detailed traffic analysis for the Interstate Commerce Commission. The traffic impact projections in the NCPO report of December 17, 1981, are too high for two reasons: (1) most workers who would commute from Colstrip would use car pools, and (2) no employee would work every day. The improvements mentioned could include reconstruction of some segments; however, as noted in the EIS, almost all improvements are needed already; they cannot be solely attributed to approval of the Montco Mine.

F See answer E.

G Spirit Rock is included in the discussion of sites eligible for listing in the National Register of Historic Places. Cheyenne Faces was denied eligibility by the Keeper of the Register and is not therefore discussed in terms of being affected by the mine.

HEARING TESTIMONY 13

H	pg. 1-7 last paragraph Department regulations require that during mining all disturbed surface drainage be passed through sediment ponds before leaving the permit area. Fig. 1-5 shows Montco's planned division and collection ditches and sediment ponds. Additional surface drainage control plans have also been submitted by Montco as part of its reclamation plan. This statement is incorrect as Montco's plan is insufficient in many areas. There are no surface control for drainage from the facilities area or post mining surface. Additionally, the sediment pond near King Creek would not sustain a 100 year precipitation event.	H	Montco has revised its surface drainage plan since the draft EIS. Please see testimony 3, answer A.
I	pg. 1-11 4th paragraph The statistical information on coal quality is not consistent with the information found in Table II-1 page II-6. Average BTU should read 8,596 BTU, 27% moisture 7.76% Ash and .35 sulfur.	I	The statistical information in the 4th paragraph on page I-11 of the draft is consistent with data contained in table II-1, page II-6. The values in Chapter I are merely weighted averages, which were derived from BTU, percent moisture, percent ash, and percent sulfur values in table III-1 and net mineable reserves data from table I-3, column 4, page I-11. The weighted average accounts for a mixture that is not composed of equal amounts of MK, ML1, MLV, and LF1 coal.
J	pg. II-7 1st paragraph The level of nickel often exceeds suspect levels but generally by small amounts. The suspect level for nickels (N.) is 1.0 ppm. In 57% of the core sampler taken, the average concentration of nickel was 4.6 ppm. This represents almost a five fold increase in the suspect level. This should represent a higher level than the closing statement in this paragraph.	J	Based on a recent, extensive literature review, the Department no longer considers nickel a problem in alkaline environments such as at the Montco minesite. See chapter II, table II-4.
K	pg. II-8 5th paragraph Supports my comment on nickel concentrations. Surely a direct contradiction of the previous conclusion that nickel often exceeds suspect levels but generally in small amounts.	K	See answer J.
L	pg. II-8 sub title Should be omitted entirely as this EIS concerns the North King area only. Obviously, additional EIS work will be needed before these areas could be considered for mining. The inclusion of these units only serves to confuse the reader. In some areas conclusions are made on only 2 core samples. If these units remain in this EIS, there should be additional sections on the overall impacts of this entire plan. Otherwise I find this document very incomplete as only the impacts of the North King unit is explained.	L	See testimony 12, answer B.
M	II-14 The spring called McKelvey Spring is either located in or near the North King unit. It can't be both.	M	See text change.
N	III-10 I'm left with the impression that Montco is going to have a very difficult time with the replacement of overburden. I'm not at all convinced that Montco can revegetate or reclamate the affected area consistent with the purposes	N	Montco has revised its overburden handling plans. The color-lithology field sorting scheme has been abandoned; the company now plans to use isopach maps, as suggested in the draft EIS. The isopach maps are, however, based on color/lithology correlations. The stockpile would be divided into three parts, satisfactorily segregating the favorable overburden. We agree that the current plan would require a soil scientist, who would have to closely cooperate with the shovel operator. See chapter III, Geology, Overburden.

HEARING TESTIMONY 13

	III-10 cont. of the act. Montco's plan indicates a careful segregated placement and replacement of favorable and unfavorable overburden. However, can this be done by utilizing only one stock pile? The entire handling plan seems to be experimental at best and would require the expertise of a soil scientist. It's hard to imagine the degree of cooperation between production oriented personnel and the time consuming expertise of the soil technician again more of a dream than reality.		
O	III-10 Other mining units should be deleted. The information presented here is incomplete.	O	See testimony 12, answer B.
P	III-15 Surface Water. Montco's permit remains deficient and incomplete without this plan. Therefore this EIS is also incomplete.	P	Please see testimony 1, answer A, and testimony 3, answer A.
Q	III-21, 22 Soils. As with the discussion on overburden, soil seems to be another gray area. Does the soil data support the conclusions made by Montco? Only 1 or 2 profiles were taken in or near the North King Unit! The worst case scenario seems to be the average. I hope that more data is collected to support any of the conclusions present in this discussion. This area seems deficient and speculative. I'm very concerned about the chances of failure in the reclamation scenario. The act says the post mining condition of the land must be returned to a condition equal or better than the premined use. There is no support data even suggesting the possibility of a successful program.	Q	Montco has revised its soil salvage and replacement plans. Note that the new plan used all sample data submitted for the entire mine plan area. The new plan is also more conservative as it uses only the most favorable soil material in the estimates. In addition, the pre-salvage sampling program would help maximize favorable soil recovery. See chapter III, Soils.
R	Railroad: Without the ICC's EIS on the Tongue River Railroad, both this EIS and Montco's mining plan are incomplete. The 19,000 + feet of Montco's railroad loop are within the permit boundry and must by considered as associated disturbance. The construction of this loop on the 100 year flood plain represents a potential problem.	R	Montco's railroad loop is considered facilities-level disturbance and is discussed along with other mine disturbance throughout the EIS. The impacts of the Tongue River Railroad are summarized in the EIS and can be reviewed in greater detail in the Interstate Commerce Commission's EIS (1983). The impacts of constructing the railroad loop on part of the Tongue River floodplain are discussed in Chapter III, Hydrology.
S	In conclusion this EIS is incomplete due to the deficiencies in Montco's mining plan. The fact that the ICC has yet to begin the EIS for the railroad also makes this EIS incomplete.	S	See answer R and testimony 1, answer A.
T	The inclusion of all the mining units is burdensome, the verbage on these additional units all sporadically addresses throughout the EIS with little data substantiating, the conclusions. This EIS doesn't address the accumalative impacts of all the units. Therefore this information should be deleted and addressed at a later time.	T	See testimony 12, answer B.
U	I see no reason to grant approval due to the incompleteness of the entire situation. Without a market for the coal, the state doesn't benefit from severance taxes. The data in this document seems to support the unsuitability of this land for revegatation and reclamation.	U	See testimony 1, answer A. Note that the Department does not have the authority to deny a permit based on the condition of coal markets or prospects for severance tax receipts.

HEARING TESTIMONY 13

Questions on the following issues:

V	II-60 - The mention of a coal development split in the Birney Village District ten (10) years ago was mentioned. I never encountered any such information.	The Birney community discussed on page II-60 is the off-reservation community, not Birney Village on the reservation. The information about the split over the coal development issue was taken from surveys.
W	II-65 - Divide up the Birney Village and White Birney. I do not know of any Birney children attending school in Sheridan, Wyoming.	Text changes have been made to better distinguish between Birney Village (on-reservation) and the off-reservation Birney community. The reference to children attending school in Sheridan only pertains to the Birney community (off-reservation).
X	II-66 - Ashland Sawmill is no longer in operation - also we do not know for sure if they ever employed 60% of the Northern Cheyenne people.	Comment noted.
Y	II-8 - States that 15% to 20% residential MONTCO construction workers will be residing on the Northern Cheyenne Reservation.	The workers identified in tables II-8 and III-9 are not moving into the area. They are Northern Cheyenne who already live on the reservation. One of the reasons the draft EIS does not project in-migration to the reservation is the lack of housing.
Z	III-9 - States that 15% to 20% of the MONTCO operation workers will reside on the Northern Cheyenne Reservation.	See answer Y.
AA	III-63 - States the Non-Indians moving into the area are not expected to live on the reservation, this differes from table's III-8 and III-9, also Northern Cheyenne Reservation has no housing available, (NCPO, Dec., 1981)	Table III-8 illustrates projected population increases for Powder River County, which is totally outside of the reservation. Table III-9 pertains to the Ashland area, which is defined below the table as an area including Ashland (the town) and the Ashland vicinity of Powder River county, areas not within the reservation.
BB	III-73 - States there is no population increase from proposed mine - differs from Western Analysis Study.	Tables 19 and 20 of the Western Analysis study clearly states that the population impact on the Northern Cheyenne Reservation (NCR) would be zero.
CC	III-4 - Variation of employment figures from 2% to 15% with a peak of 24% in 1997. Western Analysis Study for mine employment is 2% and Department of State Lands figures are 15% for construction and 15% for optional labor.	The Western Analysis study assumed both a 10 percent and 20 percent participation rate for Northern Cheyenne. The Department's 15 percent average rate is based on the historical participation of Northern Cheyenne at the mines and power plant construction in Colstrip.

Sincerely,

for Sandie Spang
Duane Hatnenn, Director
NCPO

HEARING TESTIMONY 14

COUNTY OF ROSEBUD
office of
COMMISSIONERS
FORSYTH, MONTANA

Malcolm McRae, Chairman
Henry Stokke, Vice Chairman
Ed McCaffree, Member

June 3, 1982

Gareth Moon, Commissioner
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59620

Comments on draft Environmental Impact Statement, proposed Montco Mine.

We preface these remarks by stating that this is not a new policy of the Rosebud County Commission, but it appears our position needs to be restated, after reading the draft E.I.S. on the proposed Montco Mine.

We are directing our comments to: IV-4 Air Quality; So there will be no misunderstanding, Rosebud County has no plans now or in the forseeable future to pave the road, or any portion, of Route 557, Ashland South.

IV-5 Community Services;
    a. Housing
We quote the last line of this paragraph,"Nonetheless, below is a list of actions that either Montco or some public agency could take in mitigating the housing problems created by Montco Mine development."

If the public agency referred to is Rosebud County, let us again make clear that we will not be in the housing business.

The Rosebud County Commission feels, and we submit to you, that the problems caused by the proposed Montco Mine, should be well anticipated, and a solution found, prior to any adverse impact. This must be done by the companies involved and if this permit is approved it should be conditionally approved with stipulations.

If Montco is willing to fulfill their obligations, they will find the county to be good neighbors and ready to discuss areas of concern at anytime.

Respectfully submitted,
Rosebud County Commissioners

Malcolm McRae

Ed McCaffree

Thank you for clarifying the county's position.

LETTER 1

United States Department of the Interior
GEOLOGICAL SURVEY
Water Resources Division
Federal Building, Room 428
301 South Park Avenue
Helena, Montana 59626-0076

May 25, 1982

RECEIVED
MAY 26 1982
STATE LANDS

Mr. Gareth Moon, Commissioner
Department of State Lands
1625 Eleventh Avenue
Helena, MT 59620

Dear Mr. Moon:

Several members of our staff reviewed the draft environmental impact statement (EIS) on Montco's proposed coal mine near Ashland, Montana. Our review comments are enclosed on a separate sheet. The comments are separated into three categories. First, we list editorial comments related to the existing draft. Second, we outline matters which we question based on our knowledge of the general area. Last, we suggest subject matter that should be addressed in the draft.

The extent, number, and nature of our comments illustrates that our general view of the draft is positive. The draft adequately covers all the environmental concerns and fulfills the EIS expectations of our staff.

If we can be of further help on the EIS or in elaborating our review comments, please do not hesitate to call.

Sincerely,

Joe A. Moreland

Joe A. Moreland
Assistant District Chief

Enclosure

LETTER 1

REC [illegible]
MAY 26 [illegible]
STATE [illegible]

REVIEW COMMENTS FOR MONTCO MINE EIS
by U.S. Geological Survey, WRD, Montana District

A I. Editorial Comments:

Page I-13 (figure I-6) and page I-14 (figure I-7) are confusing because of the use of two conflicting shading patterns.

Page II-13, paragraph 4, line 5 should be Ferreira not Ferrerira.

Page II-14, table data should be referenced.

Page II-14, paragraph 1, discharge figures should be referenced.

Page II-15, paragraph 6, line 2, should be $T/mi^2/yr$ not mi^2/yr.

Page II-59, explain pattern (the DER in POWDER RIVER COUNTY seems to be inside lines but has no pattern--upper arrow is superfluous).

Pages III-69 through III-75 are paginated on wrong side of page.

Chapter V has no pagination.

Page VI-3, next entry (no. 10) should be corrected and inserted between "1980, ..." and "Lockhart, J. J.,...".

Page VI-4, paragraph 4, should be Knapton not Napton and moved forward in references.

II. Comments on Data Accuracy:

B Figure I-2 and similar based figures. Ashland is 6, not 3 miles to the northeast of the North King Mining Unit. Birney is 5.5 to 6 miles to the southwest of the South Gate Mining Unit.

C Page II-13, paragraph 3. The statement that "King Creek alluvium is dry or nearly dry," is questionable. Do you have fully penetrating wells to substantiate this statement? If so, show data.

D Page II-14, paragraph 1, last sentence. Mean annual discharge of Tongue River at Tongue River Dam (41 years of record) is 465 cfs. Above dam, the discharge is 508 cfs and below the dam at Brandenberg, discharge is 542 cfs. Therefore, the 400 cfs would appear to be low. Also, the peak flow measured in 1978 was at Brandenberg Bridge.

E Page II-19, paragraph 2. Four gallons per minute flow through the mile wide coal aquifers in the North King Mine Unit is lower than expected based on data from nearby area. Cite aquifer test and gradient data used to support this estimate.

A We have revised the EIS text and figures to correct the problems you point out.

B The figures have been revised.

C Four piezometers and wells are completed in King Creek alluvium. The Department initially questioned whether this monitoring system was adequate to define the alluvial ground water regime. As a result, Montco conducted a seismic refraction reconnaissance of the King Creek alluvium to determine the lowest point of bedrock surface in the vicinity of the present monitoring wells. The results of this study indicated that only one well needed to be relocated. The Department subsequently approved the King Creek alluvial ground water monitoring system. Conclusions drawn from the seismic refraction study support the premise that King Creek alluvium in the valley's lower reach is dry or nearly dry.

D The figures you give are correct. The text has been revised to indicate a mean annual discharge of the Tongue River in the Montco Mine area of approximately 500 cfs. The peak 1978 flow of the Tongue River was indeed at Brandenberg Bridge, about 25 miles from the North King unit.

E The value of four gallons per minute for flow through the McKelvey and Knobloch coal seams, in the North King Unit, is based on water level data and aquifer test data contained in the Montco permit application (vol. 11, app. Bb). An average gradient of 0.008 feet/foot was used for the Knobloch coal and 0.004 feet/foot for the McKelvey coal. A mean transmissivity of 63 gallons per day per foot (gpdpf) was used for the Knobloch coal and 124 gpdpf for the McKelvey coal. Average width of the affected section was estimated at 5,200 feet for the Knobloch coal and 5,600 feet for the McKelvey coal.

LETTER 1

III. Comments Related to Information Not Found in the EIS:

F Page I-5. We suggest adding information (at least names and locations) for three additional mines in the area.

G Page II-13, paragraph 2 and Page II-19, paragraph 1. No mention is made of sandstone aquifers in the area. If data shows they are absent, so state, or describe their importance. In the west Otter area, the Knobloc overburden is an important aquifer.

H Page II-91, Table 8. The reporting of concentrations of Heavy Metals is inadequate. What is the value of all the less than signs? Needs description of meaning or eliminate.

I Appendix 7. The data presented is too complex and difficult to follow. This is especially true because no pre-mining information is presented for comparison.

J Final small point, the report should have a consistent page numbering system (i.e. number all pages).

F There are four additional mines in the cumulative scenario. Two are located in Otter Creek, one east and north of Ashland adjacent to Cook Mountain, and the fourth on Greenleaf Creek. Each of these sites is hypothetical, since no mine plans have been filled for any area.

G The possibility that undetected sandstone aquifers may lie in the project area has been investigated. Based on present information, experience in the area, and examination of drillers' logs, there appear to be data substantiating the existence of such sandstone units in the North King area. However, site-specific information on the hydrogeologic characteristics of these units is largely lacking. The final EIS contains revised text and impact projections based on a combination of North King area data and data extrapolated from across the Tongue River (Woessner, et al., 1978).

H Heavy metal concentrations in table II-8, page II-18 in the draft, were given in the way they were to characterize the area's water quality in a general way. Specific data are contained in volume 12, appendix Bc (Water Quality) of the Montco Mine permit application (Montco, 1983).

I Appendix 7 summarizes a more technical document. Please see the Systems Technology report (1982, on file, Department of State Lands) for details on the techniques used. All three techniques utilized available premining data. These data included overburden-paste-extract analyses from the Montco area. Premining spoil water quality data are of course nonexistent. Note that appendix 7 has been rewritten for the final EIS.

J All pages have been numbered.

LETTER 2

United States Department of the Interior
BUREAU OF MINES
P. O. BOX 25086
BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

Intermountain Field Operations Center

May 28, 1982

RECEIVED
[illegible] 198
[illegible] LANDS

Gareth Moon, Commissioner
Department of State Lands
1625 Eleventh Avenue
Helena, MT 59620

Dear Mr. Moon:

Personnel of the Bureau of Mines have reviewed the draft Environmental Impact Statement for the proposed Montco strip mine in Rosebud County, Montana. Our interest pertains largely to impacts on mineral resources or their development.

Generally, mineral resources are covered adequately in the draft EIS, but we have a few comments on this document.

A 1) Because economics of the project are based on mining several other units in addition to the North King unit, data concerning these additional units should be determined now, rather than in the future. This would provide a better foundation for informed decisions that must be made for the entire project, rather than basing these decisions only on the North King unit. Future regulatory decisions concerning subsequent units, made after a large initial investment, could be costly and could be inappropriately influenced by previous large investments in the project.

B 2) In discussing overburden, terms such as loam, sandy loam, and clay loam are used. These terms should be reserved for the discussion of unconsolidated mixtures of sand, silt, clay, and organic matter; they are usually used in discussing soils rather than overburden. More proper terms would be sandstone, siltstone, etc., for consolidated rock, and sand, silt, and clay (or various mixtures) for unconsolidated layers.

C 3) On page II-5 of the draft EIS, it is stated that the overburden is about 80' thick and the interburden about 15' thick throughout the project area. This statement does not agree with the geologic cross section of the mine plan area (Figure II-3) except in the immediate area of the North King mining unit. In the central and southwestern portions of the project area, thicknesses vary and are generally greater than those given in the text. For example, in the southwest portion of the project area (Southgate mining

A Although more data on other units would enhance the EIS, such data are unavailable. The Department does not have the authority to request that Montco provide detailed information on all future mining units.

What we have done in the EIS is to give all the information available. The result is that some topics cover life-of-mine impacts in detail; others cover these impacts only briefly. Where we could not conclude confidently about the long term with the information available, we kept our discussion to a minimum.

Future regulatory decisions, like those made now, will follow the laws and regulations governing mining. The initial investment of the company will not be an issue.

B The Department agrees that consolidated (in situ) overburden should not be given the textural terms used in describing soils (i.e. loam, sandy loam, clay loam). Note that the textural discussion in the text is referring to unconsolidated overburden which has been mechanically removed and reduced in size by either core or rotary chip drilling prior to laboratory textural analysis. The textures given in the text were taken from Dollhopf and Intrasearch, Inc. (1980), appendix N of Montco's permit application.

C According to fig. II-3, the overburden thickness ranges from 160 feet in the South O'Dell unit to about 60 feet in the North O'Dell unit, with an overall average of about 80 feet. We agree that interburden thicknesses are highly variable and the 15-foot thickness given in the text should be deleted.

LETTER 2

unit), the overburden (including coal) to be removed to reach the Nance bed is about 240', according to the cross-section. This would involve a much greater amount of waste removal and stockpiling for the Southgate unit than the 80' presently necessary for the North King unit.

Joseph B Smith

Joseph B. Smith, Chief
Intermountain Field Operations Center

LETTER 3

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
222 North 32nd Street
P.O. Box 30157
Billings, Montana 59107

IN REPLY REFER TO:
1797 (930)

28 MAY 1982

RECEIVED
JUN 02 1982
STATE LANDS

Mr. Gareth Moon
Commissioner, Department
of State Lands
Capitol Station
Helena, Montana 59620

Dear Mr. Moon:

We appreciate the opportunity to review and comment on the Draft Environmental Impact Statement for the proposed MONTCO Mine, Rosebud County. We would like to offer our compliments to the EIS Team for a well-done document.

In the discussion of stipulations or mitigation measures for Community Services (Chapter IV, D., 5.) there is presented a series of suggested mitigation actions that MONTCO could take to alleviate these sorts of impacts. For this entire section and the next (6. Fiscal Conditions), the DEIS repeatedly suggests that MONTCO, unilaterally or in conjunction with "some public agency," assume the leadership role and bear the primary burden for implementing these mitigation actions.

On pp. III-71 and 72, the DEIS lists projected revenue to the State as:

$428.3 Million - Coal Severance Taxes
$ 10.9 Million - Additional Personal Income Taxes
$ 30.0 Million - School Foundation Program
$100.0 Million - Royalties from State Coal

all of which would occur over the 24 year life of the mine. This proposed mine represents a total projected revenue source to the State of $569.2 million.

Since the community services and fiscal impacts and benefits cross multi-county and various community jurisdictions, there appears to be good reason for suggesting that the State of Montana may want to assume a more active leadership role in promoting and facilitating these mitigation actions.

Sincerely yours,

Mike Penfold
Michael J. Penfold
State Director

cc:
DM, Miles City

Thank you for your comments.

LETTER 4

DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of the
Principal Regional Official

Region VIII
Federal Office Building
1961 Stout Street
Denver CO 80294
ROFEC

RECEIVED
JUN 10 1982
STATE LANDS

June 7, 1982

Mr. Gareth Moon
Commissioner
Department of State Lands
Capitol Station
1625 Eleventh Avenue
Helena, Montana 59620

Dear Mr. Moon:

We have reviewed your Draft Environmental Impact Statement on Montco's proposed coal mine near Ashland, Montana.

A The DEIS contains no information specific to the projected impact on social services resources in the vicinity of the proposed mining operation.

It does indicate that the area "does not appear to be capable of responding to increased demand for services."

B We note that the Montana Department of Social and Rehabilitation Services (SRS) was not included among government agencies from which assistance was sought in the development of this DEIS. We recommend that comments from SRS be solicited.

Sincerely yours,

For E. W. McIntire
Director, ROFEC

A See text change in Chapter II, Community Services, and Chapter III, Sociology.

B The social services technical report (Mountain West Research Inc., November 1981) was prepared by a contractor rather than by the Department. Agencies that provided information for the technical report include the Montana Department of Social and Rehabilitation Services (SRS); the Regional Supervisor, SRS; the Bureau of Statistics and Research; the Pine Hills School for Boys; Action for Eastern Montana; the Montana East Central Mental Health Center; the Southeastern Montana Rural Health Initiative; the Rosebud County Welfare Office; the Rosebud County Publice Health Service, and the Custer County Public Welfare Office.

LETTER 5

NANCE CATTLE COMPANY
BIRNEY, MONTANA 59012

6/7/82

RECEIVED
JUN 08 1982
STATE LANDS

Mr. Gareth Moon
Dept. of State Lands -
Helena, Mont.

Dear Mr. Moon;

I would like to commend you on your Environmental Impact Statement on the Montco Mine -

I realize that all the answers to all the questions are very difficult to answer precisely -

I was at the Ashland meeting and heard the Northern Plains Res. council and the Indians with their negative criticism - This was effected - I talked to alot of the crowd however and they thought that no response was a positive response - It is easy to respond to a hypothetical question negatively but rather difficult to respond positively -

I have been under lease with Montco for some eight years, and I have found them to be very respectable people -

I hope you can get the deficiencies worked out and this Permit granted -

Sincerely Yours
Marcus L. Nance

Thank you for your comments.

LETTER 6

RECEIVED
JUN 08 1982
STATE LANDS

Mr. Gareth Moon, Commissioner
Montana Department of State Lands
Capitol Station
Helena, MT 59620

2 June, 1982

Dear Mr. Moon:

Thank you for providing me the opportunity to comment on the DSL Draft EIS on Montco's proposed mine. These are statements which seem important.

For the "life of the mine," taxes are estimated to be:

Mining	$428,300,000
State Income Tax	10,900,000
School Funds	30,000,000
State Royalties on Coal	100,000,000
That comes to:	$569,200,000.

Rosebud County will have to deal with a $10,000,000 surplus of taxes collected over costs of county services. Montanans working at the mine will earn $590,730,000 over the 30 peak production years. During the 40 year mine life, $87,280,000 will be spent on reclaiming Montana land. I will comment.

Enough is enough.

It is too much to change the rules of the "ball game" at this inning by asking a mining company to go into the housing business and public engineering business. Private enterprise should not be encouraged nor required by DSL to: take over local government responsibilities such as providing engineering, office equipment, and capital facilities; take over local school board responsibilities by providing land, classrooms, buses and housing for teachers; take over the contractors' work; take over the local owners of existing housing by setting rent controls; and take over the local banking sector's responsibilities - all "suggested" in Part 4.

The suggestions in Part 4, if carried out by DSL, would result in too much State government control over private business and too much private business control over local government.

The suggestions in Part 4 about Community Services deflect the State's responsibility to its subdivisions - towns, cities and counties - and attempts to have us believe that the taxpayer/mining company should become a paternalistic taxpayer, paying taxes and paying for everything else.

This is an attitude that led us into the hard rock mining mess of the 1800s. This is an attitude which demeans the Tribes and small town governments by taking away their responsibility and decision making. Small towns will need money.

Clearly, more state coal-related revenues should be directly distributed to local governments for mitigation of local government needs due to coal development. The DSL job is to assure compliance with the strip-mine regulations, not to create social policy.

Cordially,

Barbara Kennedy

Barbara Kennedy
Planning Consultant to the Town of Broadus

The Department's responsibility toward Montco is twofold: (1) to assure compliance with the strip-mine law and regulations and (2) to comply with the Montana Environmental Policy Act (MEPA). The EIS complies only with MEPA, and in so doing may appear to create social policy. This is not the case, however. The EIS, as MEPA requires, merely describes impacts and then suggests ways of mitigating impacts. The list of mitigating measures should not be taken as a commitment by the Department as to the stipulations for permit approval. What the Department would require of a company is not known until issuance of the mining permit.

LETTER 7

June 7, 1982
Hubert Harwood
Tongue River Stg.
Miles City, Mt. 59301

RECEIVED
JUN 10 1982
STATE LANDS

Montana Department of Lands
Capitol Station
Helena, Montana

Dear Sandi Johnson;

I am writing this letter in regard to the recent Montco Mine Hearing held in Ashland. As a concerned rancher who has owned land along the Tongur River for thirty years, I am very much against the opening of the Montco Mine and the building of the Tongue River Railroad.

A The right of way will cut through three hundred feet of the most productive agricultural land in this area—right down the middle of ours and many of the other ranchers' hayfields and crop lands. These lands are valuable and are necessary to the economic viability of many of the farms and ranches along the Tongue River. The railroad could cause many of them to go out of business as they rely heavily on the production of the hay and other crops and the reduction in their farming land greatly reduces these commodities.

B With large scale strip mining on the Tongue River the viability of the water as a source for irrigation is jeopardized. The total dissolved solids in the water , sodium adsoption ratio level in irrigation water, and the presence of heavy metals (or trace elements) will increase with strip mining. I think that there should be more study as to what extent these problems will harm agriculture production and the land before they go ahead with it, because it will be too late to do much after the land is ruined. Also the construction of the railroad implies, maybe necessitates, several more strip mines, so it is important that we know all the facts and problems this could cause before all the expense and work has occurred.

A Your comments are noted.

B Mining in the Montco area would cause insignificant impacts to the quality of water in the Tongue River. (See app. 5.) The combined mining of all areas anticipated for development in the Tongue River valley would also cause insignificant water quality impacts.

LETTER 7

Some of the problems I would have with a railroad through my land would be some of the following; (1) Natural flood systems when put through culverts will not spread but wash holes and channels, (2) Some small dams will not get natural run off-water held behind grade will raise the water table below the grade, (3) Cattle will have to cross in many places to water, (4) crossings—There will be limited or inconvenient access to buildings and fields. Most places are on the river, feed in the winter will have to be hauled across the railroad to cows or cattle travel back and forth to pasture. Some children will have to travel back and forth across tracks to get to and from school, crossing the tracks twice each day. Equipment 53 ft. wide, should have 60 ft. crossings, etc. (5) cattle crossings—The small pipes they use for cattle crossings (calf weiners) are no good. One large cow or bull shading up will stop the whole bunch of cattle from watering all day. It will take twice as much help and twice as long to move cows through a pipe if you are lucky enough to get through before a train comes through and scatters them. Roads should be fenced before construction to prevent cattle mixing. (6) weed control—Right of way through fields must have control of noxious and undesirable weeds to prevent the spreading of these through the counties.

Sincerely,

Hubert Harwood

Hubert Harwood

Your comments are noted.

LETTER 8

Ashland, Montana 59003
June 6, 1982

Garth Moon
Commissioner of State Lands
Capitol Station
Helena, Montana 59620

Dear Mr. Moon:

This is in regard to the Montco mining and reclamation plan. I believe that the permits should be issued

A One of the big objections seem to be on water quality of the lower Tongue River. As far as domestic use is concerned, I'm sure some sort of purification would be necessary just the same as it would be if used from any other river. I can't believe it would hurt livestock as they already drink from alkali wells and reserviors. As for the people who use irrigation water, it doesn't seem to effect the people below the Tongue River Dam.

B I am sure that the mine would mean an influx of people but it would also mean an increase of business for the merchants and in increase in tax revenue which would enable us to have better schools, roads and other services.

C I believe that if the Montco mine is opened, the Badgett mine will eventually be opened also. This will be a great benefit to the people of Powder River County.

Sincerely;

Howard S. Allen
Howard S Allen

A Neither the Montco Mine nor the combined effects of all mine development expected in the Tongue River valley would significantly affect Tongue River water quality.

B Thank you for your comments.

C Thank you for your comments.

LETTER 9

RECEIVED
JUN 10 1982
STATE LANDS

June 5, 1982
Ashland, Montana 59003

Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59601

Re: Montco Mine Draft E.I.S.

Dear Commissioner:

The more I study this EIS, the more disheartened I become. I cannot understand why this was written as it was or when it was. Please consider my analysis in general terms:

#1. It is ambiguous.
#2. It is premature.
#3. It is incomplete.
#4. It is vague and suggestive rather than positive and official, ie., doubletalk.

My deductions and answers to the above have been split also.

Either #1. Your staff knows what they are doing and have completed this according to Montana Law (which the public does not understand anyway).

or #2. Your staff is sloppy and doesn't give a damn what they do.

or #3. Your staff was pressured on time and intend to finish work before the final E.I.S.

A One small example is page IV-3 where the word "could" is used six times. It does not say they will do anything on this whole page. This type of language is used repeatedly which renders the material nearly worthless.

B Now, I will limit my constructive comments to include: The Montco Draft EIS does not sufficiently analyze the effect of additional dissolved solids polution to the Tongue River in situations which are considered possible or do actually occur some years.

C This EIS states on Page III-16 "that Tongue River water for irrigation may decrease downstream in the Miles City, Montana vicinity; however it would still be suitable for irrigation of most crops under most conditions". It also states that "the increase in TDS levels would be insignificant compared to projected

A In accordance with the Montana Environmental Policy Act, the EIS does not lay out the decision of the Department. Rather, it identifies impacts and, further, identifies means of mitigating these impacts. The EIS appears indecisive for the very reason that it does not set forth the Department's decision. We use the word "could" in chapter IV, because the Department does not decide what will be required until after issuance of the final EIS.

B As stated in the draft, a quantitative computer model described by Woods (1981) was used in the Tongue River petition evaluation (DSL and OSM, 1982) to predict dissolved solids concentrations in the Tongue River under various development scenarios. In this final EIS, additional computer simulations were used to predict impacts to the Tongue River in situations that would cause differences in degradation to river quality. Historical low flow in the Tongue River was included. The various development scenarios modeled for the Tongue River valley are included in chapter III, Hydrology. The scenarios offer a broad range of potential situations which exist or could occur on the Tongue River. See revised text, chapter III, Hydrology.

C The statement concerning the suitability of the Tongue River water for irrigation indicates that, with added mining, the quality of river water may decrease in the vicinity of Miles City. But the decrease in quality would be negligible, and the water's suitability for irrigation would be comparable to today's conditions. Current irrigation along the river would not be significantly affected.

LETTER 9

TDS levels with increased irrigation in combination with no mining".

Now analyze what you have just read:

#1. If our land is reduced to "most crops under most conditions" by mining then there most probably will not be any increase in irrigation.

#2. Any further increase in mining would most probably be more damaging by dissolved solids concentrate increases. Evidently the model used in the E.I.S. did not consider under any circumstance the dewatering of Tongue River which occurs about one year of ten regardless. During these periods the stream bed is dry of any flow except stream bank return. Your model should consider this very low flow also instead of extrapolating 179 cfs as the low which it is not in practicality.

D What about Tongue River Dam? Did you assume there would be a new larger dam? If so, you should also consider the reality that there may not be any enlargement of Tongue River Dam for many many years.

E The possibility of Tongue River Dam being washed out entirely is greater than construction of a new dam, sadly enough. Should there be no Tongue River Dam, there would be long periods of negligible flows in Tongue River and corresponding increases of dissolved solids. This should be one possibility to consider.

F Therefore, I maintain that you must consider a fairly high level of mining (certainly if the so called Tongue River Railroad is ever to be afforded) with irrigation as it is at present and river flow in some years at a practical minimum which may be around 40 cfs or less including stream bank return. Stream bank return is heavily poluted also, remember.

G What I'm trying to point out is that I see no evidence that your worst case scenario includes a reduction in irrigation and reduced river flow both of which are entirely possible.

Thank you for your consideration.

Sincerely,

Herb Mobley

Herb Mobley

The second statement indicates that the increase in dissolved solids concentrations with added mining would be insignificant compared to another possibility: increased irrigation and no more mining.

It is true that Tongue River flows are occasionally less than those used in the computer model. During extreme low-flow periods, however, insufficient water is available for irrigation, rendering analysis of irrigation water quality irrelevant.

D The Woods (1981) model, as used in the final Tongue River Petition Evaluation Document (DSL and OSM, 1982), incorporated only the enlarged Tongue River Dam. The analysis in the draft EIS (app. 5) did the same. We have added to the final EIS an analysis using the Woods computer model (1981) with the dam and reservoir as they are today. Please note text changes.

E Without a dam, late summer low flows and corresponding increased dissolved solids concentrations would--with or without more mining--make the water unavailable and unfit for irrigation. A close analogy to this situation was computer modeled for the final EIS. The modeling, which assumed historic low flow conditions, projected that the river would run out of water in its lower reaches in early summer.

F Your proposed scenario of mining and irrigation activity in the Tongue River valley has been modeled and is included in the final EIS. (See chapter III, Hydrology.) All anticipated mining in the Tongue River valley was included in this scenario in combination with today's irrigation practices during historic low flow of the Tongue River.

G A reduction of irrigation activity along the Tongue River would improve the quality of river water. (See the analysis using the Woods (1981) model in the draft EIS, appendix 5.) Reduced river flow would increase dissolved solids concentrations in the river, but irrigation becomes less likely in this situation due to the lack of available water.

LETTER 10

PATTY KLUVER
Route 1
Forsyth, Montana 59327
June 7, 1982

RECEIVED
JUN 08 1982
STATE LANDS

Mr. Gareth Moon, Commissioner
Dept. of State Lands
Capital Station
Helena, Montana 59601

Re: Montco Mine

Dear Sir:

Thank you for coming to Ashland to hear our testimony relative to the prospective Montco coal strip mine on Tongue river near Ashland. It is to augment that oral testimony that this letter is written.

A In the first EIS distributed to the County Courthouses, one of the volumes was devoted to Hydrology, regarding the Montco mine project. It claimed that the groundwater flowing through the coal seams of the area was from west to east in a slightly northerly direction. The accompanying maps indicated the same direction.

In the updated EIS available in the Rosebud Co. courthouse, the groundwater has taken a quarter turn or more. It is now declared the water flows to the northwest, toward Tongue river.

In every Geology study published to date, the groundwater flow along the syncline of the Powder River Basin is to the east, and, some times, tilting slightly to the south. Therfore, the direction of the groundwater flow at Montco, as reported by the most recent EIS, would be up hill!

It appears very unlikely that the groundwater at Montco would travel counter to the natural syncline, the one followed by the waters encountered in the Decker or Colstrip stripmine operation! Therefore, the Dept. of State Lands should certainly investigate to seek the facts.

B At the Hearing in Ashland, I read from a Bulletin, Quality Criteria For Water, published by the Environmental Protection Agency, July 1976. The chief concern expressed was with regard to Iron, the fourth most abundant, by weight, of the elements that make up the earth's crust, to quote the section, (p. 78.)

The reason for the emphasis on Iron was, I noted in the EIS at the Courthouse, Iron exceeded the standards set by E.P.A. so far that it was not even listed per centage wise. While measurements of Total Desolved Solids for groundwater in the area were acknowledged to exceed standards; with Fluoride, Boron, and Sulfate among those most concentrated, Iron ran clear off the chart.

C The Dept. of State Lands has announced certain of the Montco EIS study unacceptable. D The fact that no alternative to the disposal of the groundwater was offered, except discharge to Tongue river, should be food for concern.

A Please see answer A to your hearing testimony (number 7). Also, refer to the Department's letter to you of June 11, 1982:

> In reviewing your discussion, I believe that you are confusing the Draft Environmental Impact Statement (EIS) with the Montco Permit Application. The draft EIS occupies only one volume and contains no maps showing direction of ground water flow. The original copy of Montco's permit application consisted of eight volumes, of which two were devoted to hydrology. The original application was withdrawn by Montco, completely revised, and resubmitted at the request of the Department. This was because of numerous errors and inconsistencies that came to light during our initial review.
>
> In reviewing potentiometric surface maps from both applications, my staff has not found the inconsistencies you have described in your letter. On map V-2-3, potentiometric and structural contours are mislabeled in the original copy, although they are correctly labeled in the legend.
>
> You are correct in that regional slope is to the east. However, ground water movement in the proposed Montco mine area is to the northwest, approximately perpendicular to the structural dip of the coal beds in the North King Mining Unit. This phenomenon is not unusual; it has also been observed at the East Decker mine.

B Please see answer B to your hearing testimony. Also, refer again to the June 11, 1982, letter:

> Regarding iron in the ground water, let me impress on you the fact that the iron is in water coming from undisturbed aquifers that are currently discharging to the Tongue River. If there would be any deleterious effects from the amount of iron in the ground water, it should have already shown up. The Department determined that the Montco Mine would not have a significant adverse effect on the Tongue River because the rate of discharge is very low. Ground water would be diluted after entering the Tongue River.

C The Department has not announced that any part of the EIS is unacceptable. If you are referring to the completeness of Montco's application, refer to testimony 1, answer A.

D Investigations undertaken for the draft and final EISs indicate that mining by Montco would not measurably degrade the quality of the Tongue River.

LETTER 10

PATTY KLUVER
Route 1
Forsyth, Montana 59327

p. 2

It is recognized that Tongue river is the aquifer for some of the best surface water in southeastern Montana. Why, then, permit further degradation, so that it can no longer be used for production of food.

E The cumulative affects of the mine at Decker, plus those more recent ones, or proposed ones, in that area, pose as a very serious threat to the waters of Tongue river dam. This is because of the presence of Iron in the waste waters from the mines. Very probably, in the future there will be no fishing in the lake, because of the presence of Iron, sulfate, etc. It kills the eggs, the fish, and the food on which fish survive.

Hopefully, the Dept. of State Lands will avail themselves of the book mentioned in the forpart of this letter. They, and more particularly, you are responsible for a monumental decision. Is the current economic picture more important than the long range well being of the State of Montana.

While the majesty of the mountains of the western part of the state of Montana is acknowledged, please bear in mind this eastern half is, in most part, owned by people who are citizens of this State. They pay the taxes on which this state has survived this past Century.

F If the natural route of the groundwater is destroyed in favor of special economic gains, the surface water will also be degraded beyond use for irrigation, household, or livestock. How long would the Coal Severence Tax last, if supporting and being dipped in to in liew of what once was prime agricultural land?

Thank you sincerely,

Patty Kluver

Patty Kluver

cc: Brace Hayden

E There is no evidence to support that mining above the Tongue River Dam, in conjunction with plans by Montco to mine along the river between Ashland and Birney, would significantly or measurably increase concentrations of either dissolved iron or sulfate in the Tongue River.

F Please refer to the revised parts of the text that elaborate on predicted Tongue River water quality.

LETTER 11

PATTEN & RENZ
ATTORNEYS AT LAW
LOWER LEVEL ONE
FIRST CITIZENS BANK BUILDING
2812 1ST AVENUE NORTH
BILLINGS, MONTANA 59101
(406) 252-6782

JAMES A PATTEN
JEFFREY T RENZ

OF COUNSEL
FRED N. DUGAN

RECEIVED
JUN 09 1982
STATE LANDS

June 8, 1982

Mr. Gareth Moon
Commissioner
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59620

Re: MONTCO DEIS

Dear Commissioner Moon:

I have cursorily reviewed the Draft Environmental Impact Statement, Montco Mine. My personal comments follow:

A Northern Cheyenne. The most glaring omission is the failure to include a detailed and comprehensive discussion of the Cheyenne religion and culture. You should refer to two works by Rev. Peter J. Powell, Sweet Medicine and People of the Sacred Mountain.

B Birney Day School, as the DEIS reflects, is the regional center of the "traditional" Cheyenne. The DEIS fails to discuss what this means. The "traditional" Cheyenne are the cultural sanctuary for Cheyenne language and religion. The "traditional" Cheyenne settled around Birney Day School to avoid whites.

C The DEIS fails to reflect that the MONTCO mine will directly affect the Northern Cheyenne religion. As the spiritual center, the Birney area, on both sides of the Tongue, is the location for many vision quests and individual religious ceremonies. A mine will desecrate this area.

Many sacred clays are found in the Tongue River Valley in the Birney-Ashland area. These are employed in Cheyenne religious ceremonies. Most sacred plants are found in this area.

The most notable example of coal development's profanity is found in Powell, People of the Sacred Mountain. Sweet Medecine, the Cheyenne culture hero, predicts that coal development will lead to the fall and the scattering of the Cheyenne people.

D The Department needs to present a more detailed and compre-

A The draft EIS does not describe the Cheyenne religion and culture in detail, but does point out (pp. II-66, II-67, II-69, etc.) that Cheyenne culture and values differ from those of surrounding non-Cheyenne populations. Note that the report submitted to the Department of State Lands by the Northern Cheyenne Tribe Planning Office (Aug. 1981) and intended to serve as the basis for the draft EIS does not include a detailed description of either culture or religion.

B The draft EIS notes that a majority (60%) of the Birney area residents disapprove of an influx of non-Cheyenne into the area (p. III-63) and that the mine is likely to have impacts on the area. The area is characterized as "traditionally Cheyenne" (pp. III-63 and II-69) with over half the households using Northern Cheyenne as the primary language (pp. II-69 and II-70).

C The draft EIS did note that the mine's development would have an impact on the Northern Cheyenne's culture, of which religion is one aspect. Religion can be divided into beliefs and practices. The Montco Mine should have no effect on the beliefs of the Northern Cheyenne. The practices would be affected only in that a potential location for those on vision quests would be altered. Note, however, that the location of the mine has already been altered from its pristine state. In addition, there are other locations nearby with similar characteristics.

D See answer A.

LETTER 11

Mr. Gareth Moon
June 8, 1982
Page two

hensive discussion of the Cheyenne religion, of Cheyenne religious ceremonies, of the relationship of the hallowed Birney area to both the Cheyenne religion and religious ceremonies so that you may understand clearly that coal development along the Tongue would, in effect, be sacrilegious.

E Ethno botany. The ethnobotany discussion at II-25 should be similarly expanded. Noting only that some plants are used in religious ceremonies is like saying bread is used in Christian ceremonies. It is hardly descriptive.

F Your discussion of sweetgrass is incorrect. Jeff Hart, with the assistance of a Cheyenne woman, found sweetgrass within the mine plan area. (Hart, personal communication, 1976). I have seen and smelled the rope which he made from these specimens.
G You should also correct Table II-10. Sweetgrass, juniper, kinnikinnick, yarrowroot and cottonwood, among others, are sacred plants used in religious ceremonies. The table omits white "man" sage.

Sincerely,

Jeffrey T. Renz

JTR/jab

E The use of native plants by the Northern Cheyenne people has not been extensively studied. (See p. II-25 of the draft.) Montco (1983) and Hart and Moore (1976) provide the only readily available information. The Department did contact the tribal offices in the Lame Deer twice, but the tribe submitted no additional information.

F The discussion of sweetgrass in the EIS has not been changed. We agree that the plant can probably be found in or near the proposed mine area; however, based on the combined field experience of two Montana consulting firms, sweetgrass is considered to be uncommon in the Tongue River Valley and Rosebud County (Jerry Moore, OEA Research, oral commun., June 17, 1982; Cliff Youmans, ECON Inc., oral commun., June 21, 1982). Beech Warner, Range Conservationist with the Rosebud County Conservation Service Office in Forsyth, has only seen this plant in disturbed areas such as old fields and dumps, and feels the plant is uncommon in Rosebud County (oral commun., June 21, 1982).

G Table II-10 has been corrected. Thank you for your comment. White "man" sage was not omitted; it is also called "cudweed sagewort." The table has been revised to clarify this.

LETTER 12

RECEIVED
JUN 15 1982
STATE LAND.

June 11, 1982

Gareth Moon
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59601

Dear Mr. Moon:

Regarding the MontCo's mine in Rosebud County, Montana, after evaluating the environmental impact statement, it is my belief that the company will be able to mine and recove the lands with no harmful results. I am in favor of the proposed mine.

Sincerely yours,

Joe Fabian

Joe Fabian

Thank you for commenting.

LETTER 13

RECEIVED
JUN 1 1982
STATE LANDS

June 9, 1982

Gareth Moon
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59601

Dear Mr. Moon:

Upon reviewing the draft environmental impact statement in regards to the proposed mine in Rosebud County, Montana, to be developed by MontCo, I am of the opinion that the company can mine and recoverthe lands without adversely effecting the area.

I am in complete agreement with the proposal.

Sincerely yours,

Jeanne Clapp

Thank you for commenting.

LETTER 14

RECEIVED
JUN 11 1982
STATE LANDS

June 9, 1982

Gareth Moon
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59601

Dear Mr. Moon:

I am writing you in regards to response to the draft environmental impact statement for the proposed MontCo mine, Rosebud County, Montana.

After reviewing said draft of the environmental impact statement, it is my firm belief that said company will be able to mine said land and reclaim with no adverse impacts. Therefore, I am writing you this letter in support of said proposed mine.

Very truly yours,

Brett A. Boedecker

Thank you for commenting.

LETTER 15

June 9, 1982

RECEIVED
JUN 11 1982
STATE LANDS

Gareth Moon
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59601

Dear Mr. Moon:

This is in regards to the EIS to the proposed MontCo mine to be located in Rosebud County, Montana.

After examining the statement, I believe that the company can mine the lands and also restore the same, leaving no detrimental results.

I am, therefore, in support of the proposed mine.

Very truly yours,

Susanne Boedecker

Susanne Boedecker

Thank you for commenting.

LETTER 16

RECEIVED
JUN 17 1982
STATE LANDS

June 9, 1982

Gareth Moon
Department of State Lands
1625 - 11th Avenue
Helena, Montana 59601

Dear Mr. Moon:

Upon studying the EIS concerning the proposed mine in Rosebud County, Montana, to be developed by MontCo, I believe the company can properly mine and restore the lands so there will be no unfavorable effects to the land. I am in support of the mine.

Yours truly,

Duane Kuntz

Thank you for commenting.

LETTER 17

RECEIVED
JUN 14 1982
STATE LANDS

June 10, 1982

Gareth Moon
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59601

Dear Mr. Moon:

Upon reviewing the draft environmental impract statement in regards to the proposed mine in Rosebud County to be developed by MontCo., I believe the company can mine and reclaim the lands without adversely effecting the area.

I am in agreement with the proposal.

Yours very truly,

Sandra W Snow

Sandra W.Snow

Thank you for commenting.

LETTER 18

RECEIVED
JUN 16 1982
STATE LANDS

June 8, 1982

Gareth Moon
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59601

DearMr. Moon:

In response to the environmental imract statement concerning MontCo's mine in Rosebud County, Montana, I feel the company can mine and reclaim the lands with no harmful outcome.

Very truly yours,

C. D. Nelson

C. D. Nelson

Thank you for commenting.

LETTER 19

June 9, 1982

RECEIVED
JUN 17 1982
STATE LANDS

Gareth Moon
Department of State Lands
1625 - 11th Avenue
Helena, Montana 59601

Dear Mr. Moon:

I am of the opinion that MontCo can properly mine and reclaim the lands in Rosebud County, Montana, for its proposed mine.

Sincerely yours,

Alfred Kron

Alfred Kron

Thank you for commenting.

LETTER 20

June 10, 1982

RECEIVED
JUN 14 1982
STATE LANDS

Gareth Moon
Department of State Lands
1625 - 11th Avenue
Helena, Montana 59601

Dear Mr. Moon:

In regards to MontCo's proposed mine in Rosebud County Montana, I am in support of the same.

I feel there would be no detrimental effects if the lands were mined and reclaimed.

Very truly yours,

Dennis J. Snow
Dennis Snow

Thank you for commenting.

LETTER 21

msu

DEPARTMENT OF SOCIOLOGY

COLLEGE OF LETTERS & SCIENCE MONTANA STATE UNIVERSITY, BOZEMAN 59717

June 10, 1982

RECEIVED
JUN 14 1982
STATE LANDS

Mr. Gareth Moon
Commissioner
State of Montana
Department of State Lands
1625 Eleventh Avenue
Helena, MT 59620

Dear Mr. Moon,

The following comments are directed to you as my response to sociological component (SIA) of the draft environmental impact statement regarding the proposed Montco coal mine near Ashland, Montana. The SIA-EIS is among the most comprehensive and well executed pieces of work I have seen. Your staff did an excellent job.

Several of the points made deserve reiteration. In addition other comments regarding specific disagreements or the SIA-EIS process in general will be made. These comments are my interpretations and in no way reflect my association with Montana State University or other employers or organizations.

A On the basis of the information presented it appears that the Ashland, Birney and Northern Cheyenne communities would be significantly altered if the mine is permitted. Opposition to these changes in community structure are both widespread and intense. Accomodating change, of course, involves more than value orientations. The information presented indicates Ashland would be incapable of satisfactorily providing facilities and services. The other two communities would experience probable disruptions of their life styles in addition to potentially negative effects upon service capacities. Finally, data indicate that deviance and social disorganization effectively would be inevitable during the construction phase.

B My personal feeling, based upon several years involvement with social impact
analysis and considerable knowledge of the study area, is that the degree
of disruption is somewhat underestimated or discounted. For example, I
would maintain, in disagreement with the Montco EIS, that the political
structure of Birney would be disrupted and would cause further schisms
C within the community. Moreover, the increases in deviance and social
disorganization can not be facilely "explained away" due to modifications
of the age-sex structure, as was done in the discussion of increased
divorces in boom towns. Increases in both the composition of young adults
and increases in the drug, alcohol criminal and personally abusive activities
that accompany them, indicate real changes in the host community.

A Thank you for your comments.

B The magnitude of impacts on Birney's political structure, as well as on the structure of other communities, was projected after making assumptions about the amount and type of contact the community members would have with new residents or users of the community. The new members would presumably introduce new ideas, values, or behaviors that would create an emotional, attitudinal, or behavioral impact on community members who exist in a static or near-static state.

According to our estimates, only 17 Montco workers would live in Birney, and because of commuting and shopping patterns, few others would have significant contact with Birney residents. Some of these 17 individuals are likely to be long-term Birney residents, and the remaining new residents may move into the community only gradually, since peak employment would not be realized for several years. The additional individuals and their families may do little more than stabilize a population, which otherwise is projected (p. II-61) to decrease from 136 to 117 people over the next 30 years. The composition of the community would change some, but the degree of change and how negative the change would be depend on several unknown factors.

Our findings, in short, indicate that Birney's relatively stable political structure is unlikely to be dramatically affected by the population increase from the Montco Mine. The cumulative impact on Birney is likely to be substantial, but only a small portion of that impact is likely to come from the Montco Mine.

C We are not attempting to "explain away" possible changes in family structure or other institutions that might be created by new residents moving into an area. Note that professionals do not agree about either the magnitude or cause of changes in boom towns. Furthermore, neither Birney nor Northern Cheyenne communites are likely to become boom towns owing solely to the Montco Mine (assuming we define boom town as an area with sudden and dramatic population growth). Ashland would grow most, and would change in character, but would not grow as Colstrip has.

You are of course correct that some increase in the number of selected "deviant activities" can be expected and they would indeed be accompanied by some "personally abusive activities." But the Montco Mine would not create an unmanageable level of these problems for the host communities, especially if the community, company, and other governmental and private groups work together for mitigation.

LETTER 21

Mr. Gareth Moon
Page 2

D More general comments regarding the SIA-EIS process also are warranted.
First, the clean and precise presentation and documentation of potential
impacts mask the inaccuracy and speculative nature of the process. A
single policy decision effecting coal prices or labor factors can upset
projections. A new technology can make the need for production obsolete.
Even when factors are rather direct and known, accurate projections probably
are due more to luck than scientific expertise. However, once printed
the figures seem to take on a scientific sanctity, which is far more than
E they warrant. Second, the figures and abstract concepts around which they are
necessarily organized tend to make decision makers forget that the effects
are upon people who have invested their lives in their small and rather
unique communities. They are extremely vulnerable in the impact process
and likely to suffer from their vulnerability to externally induced change.
The EIS documents a major change in life style. Life in the study area
would effectively be modified from rural agrarian to a differentiated
industrial form of community. The small, face to face and informal character
of life, based upon somewhat homogeneous values and behaviors would be
expected to be changed. Those are the very qualities most valued by rural
F community residents. Third, the EIS generally, fails to address the eventual
closing of the industry. The bust portion of the cycle is another cruel
impact, often making the jobs created during the project appear to be questionable value.

On the basis of these concerns I would recommend that the permit for the Montco Mine, as well as other intensive coal development proposed for the Ashland-Birney area, be denied. I shall be pleased to answer any questions you or your staff have regarding my comments or this matter in general.

Sincerely,

Patrick C. Jobes

Patrick C. Jobes
Professor

D We agree. Thank you for your comments.

E We agree that decision makers should not forget that impacts are upon people. Bear in mind, however, that Western society, the United States, and the Ashland-Birney area have long trended toward mass society--that is, toward emphasis on secondary groups from primary groups, to contractual from organic, etc. The EIS gives information to help communities adjust to such trends, which would be suddenly accelerated by population and industrial growth.

F Please see appendix 9, added to the final EIS to discuss this issue.

LETTER 22

Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

In reply refer to SJ

June 10, 1982

RECEIVED
JUN 14 1982
STATE LANDS

Mr. Gareth Moon - Commissioner
Montana Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59620

Dear Sir:

We have reviewed the Draft Environmental Impact Statement for the proposed Montco Mine in Rosebud County. Although this proposal is outside of the Bonneville Power Administration service area, we do have some comments on the electrical energy supply to the proposed mine.

The proposal's long-term requirements for energy and its source is not addressed, beyond the reference on page I-5 to the 69-kV line. Answers to the following questions would aid the reader's evaluation of this aspect of the proposal:

A 1. Who will be providing electrical service to the mine?

B 2. Is there an existing powerline from Ashland to the facilities area?

C 3. What will the annual power demand be?

D 4. Is this demand significant?

We appreciate the opportunity to review this document. If you have any questions, please contact Mr. Tom Giese of my staff, telephone (503) 230-5136 or FTS 429-5136.

Sincerely,

Anthony R. Morrell

Anthony R. Morrell
Environmental Manager

A The Tongue River Electric Cooperative would supply power to the mine.

B Although a powerline runs through the valley, Montco would demand a larger, 69 kV, line.

C Montco's operations would consume about 25 million kV hours per year of electricity. Over the life of the mine, the operation would consume about 550 million kV hours of electricity.

D The additional electrical energy load could be served by existing power plants or plants under construction. The Tongue River Coop is a member of the Central Montana Generating and Transmission Cooperative, which recently signed a contract with the Montana Power Company to be served as a firm wholesale customer. The additional loads would therefore be served by Montana Power, which now has and will continue to have surplus generating capacity with Units 3 and 4. Demand would not be significant from the standpoint of generating capacity.

LETTER 23

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Billings Area Office
Federal Building, Room 3035
316 North 26th Street
Billings, Montana 59101-1396

IN REPLY REFER TO:
ES

June 16, 1982

RECEIVED
JUN 17 1982
STATE LANDS

Mr. Gareth Moon, Commissioner
Montana Department of State Lands
Capitol Station
1625 Eleventh Avenue
Helena, MT 59620

Dear Mr. Moon:

We have reviewed the DEIS for Montco Mine, Rosebud County, Montana. We found that the DEIS adequately describes impacts on fish and wildlife resources that would be expected to occur from the proposed development.

We appreciate the opportunity to review and comment on your DEIS.

Sincerely,

John G. Wood
Acting Area Manager

cc: Director, Montana Department of Fish, Wildlife, and Parks,
Helena, MT
Regional Director, USFWS, Denver, CO (ENV)

Thank you for commenting.

LETTER 24

United States Department of the Interior

Minerals Management Service
North Central Region
P.O. Box 2859
Casper, Wyoming 82602

In Reply Refer to:

JUN 1 4 1982

RECEIVED
JUN 16 1982
STATE LANDS

State of Montana
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59620

Dear Commissioner Moon:

Thank you for the opportunity to review the Draft Environmental Impact Statement for Montco Mine, Rosebud County, Montana. We have reviewed the subject document and offer the following comments:

A Page II-28, b. Range Condition and Recommended Stocking Rates. We note that the potential recommended stocking rate (RSR) is higher than the existing RSR. Is the potential RSR based on soils or climatic conditions? The 85-90 percent climax vegetation production level may not be achieved, especially if the top soil is mixed with other soil horizons. Rationale for the potential production level should be provided.

B Page III-20, e. Soils, 2. North King Mining Unit, a. Soil cover, depth, and quality. Montco proposes to remove both topsoil and subsoil for reclamation and revegetation purposes. Some of the subsoil contains unfavorable elements including soluble salts, sodium, clay or a combination of all three. These elements will impact revegetation success. What is the rationale for mixing topsoil with subsoils?

C Page III-27,5. Soil Stockpile Stabilization. This subsection does not indicate the slope of the soil stockpiles. Outslopes of the stockpiles are best stabilized when they are not allowed to become too steep for traversing by mechanical equipment.

D Page III-30, e. Range Condition and Stocking Rates. We note that Montco used grazing trial information from the Rosebud Mine regarding increased stocking rates on reclaimed land. Additional information should be included in this subsection on Western Energy Company's grazing trial, especially on the long term stocking rates.

E Page III-30, f. Irrigation. Montco proposes to water tree transplants during periods of moisture stress for about 2 years. Initial irrigation would also help grass and shrub seed germination. Has Montco considered watering the grass areas in addition to the transplanted trees?

Sincerely,

Dwayne E. Hull

Dwayne E. Hull

A The potential RSR was based on both range sites and climatic data (U.S. Department of Agriculture, Soil Conservation Service, 1981). However, DSL agrees with your comment that the 85 to 90 percent climax vegetation production level may not be achieved, and is somewhat of an unrealistic goal. Instead, the text has been changed to reflect a potential equal to a 75 percent climax vegetation production level, which is what the Soil Conservation Service usually uses in its range management planning. Note that topsoil would not be mixed with subsoil.

B Montco is proposing a two-lift soil salvage operation that keeps topsoil and subsoil separate. This section discusses the combined soil cover and depth, and therefore the term "soil" includes both topsoil and subsoil. The unfavorable material discussed in the draft EIS would not, under Montco's revised plan, be salvaged. Note that this section has been rewritten for the final EIS to reflect the most recent changes in Montco's plans.

C According to Montco's permit application, soil stockpiles would have slopes of 3:1 or less. Mechanical equipment would be used for seedbed preparation and seeding on slopes of less than 3:1. The 3:1 slopes would be broadcast seeded by hand.

D This sentence has been deleted, as it does not apply to the Montco area.

E Irrigation of grass and shrub reclamation areas has not been proposed by Montco.

LETTER 25

THE BROWN CATTLE CO.
BIRNEY, MONTANA

June 15, 1982

RECEIVE
JUN 22 1982
STATE LANDS

Mr Garth Moon
State Land Commissioner
Helena, Montana 59620

Dear Commissioner,

I am writing to you in response to the EIS meeting held in Ashland, Mont. June 3rd.

The Northern Plains Resource Council members, who seem to be the only ones who testified, did not address themselves in any amount of detail to the Geology, Hydrology, Soils, Vegetation, Aquatic Ecology, Wildlife, Climate, Air Quality, Employment or Income. They did address themselves with many generalizations and assumptions on the Sociological impact and the ability of Montco to assume the entire spectrum of things that they consider negative factors.

The Brown Cattle Co. has an economic interest in the Montco Mine. All the presentations that evening were negative as they were made by members of the N.P.R.C., whose goal it is to stop mining. I would like to mention some positive positions.

A First if the mining of coal is not in the National interest, then why is the goverment making such an effort to lease their coal?

A Thank you for your comments.

Second, certainly the interest of the State of Montana and to all its citizens is to develope its resources, provide opportunity, to increase the revenue that will relieve the tax burden and provide money for education and social services.

Third, the EIS does not mention the legal commitments, not only made to Montco but to other companies. These commitments do not indicate a negative attitude by all the people in this area. For example, in the Birney area there

LETTER 25

are sixteen ranches in the Birney School district. At the end of the initial activity in 1975, eight of these ranches had made legal commitments, five of the others had indicated publicly they would be willing to do so and only three, all of whom had ample supplemental income were against any development. The other approximate ten families of the Birney area were equally divided.

Fourth, I would like to address myself to what I believe to be the reason that not only in Birney, but also from the Head of Otter Creek down, so many people have made legal commitments and have indicated their willingness to accept change for their whole family, those that are still living in the area and those away from home because home did not provide enough economic stability. The economic security and the chance to get out of debt are the main reasons that these ranches made their coal commitments. Industrial activity will offer all members of the family economic opportunity and the money to achieve their goals, along with some social and educational opportunities that are not now available.

When Mr Highwalker, in his EIS paper at the meeting said that the use of Indian labor at Colstrip had been well received and that the tribe was now in favor of development, it was a positive statement.

I would like to address myself to a more specific matter referred to in section III, page twelve and thirteen.

B As a Veterinarian, I have practiced in Southeastern Montana from the entire area south of the Musselshell River to the Powder River and into some parts of northern Wyoming. I practiced twenty years out of Billings and the same number of years at Birney. I have never diagnosed plant induced mineral toxicity in this area. It is my experience that Lead poisoning is always related to outside manufactured products, not plant life.

C In the mention of Molybdenum, I am enclosing a copy of a page out of "Bovine Medicine and Surgery" by Gibbons, Catcott, Smithcors, copyright of the American Veterinary Publications Inc. 1970. The paragraph that deals with

B Thank you for this information.

C The paragraph on page III-13 of the draft EIS that refers to the 1.9 ppm average molybdenum concentration is discussing overburden levels, not plant levels. The second sentence of that paragraph states that Mo is rarely toxic to plants. In fact, molybdenum toxicity to plants has only been observed under experimental conditions in the laboratory (Vlek and Lindsay, 1977; Johnson, 1966).

Molybdenum is of concern in disturbed areas because of the copper imbalance (molybdenosis) it can cause in livestock that graze on forage containing accumulated molybdenum. Leguminous plants (such as alfalfa, sweet clover, cowpeas, etc.) are known accumulators of molybdenum (Erdman et al., 1978). Gough et al. (1979) report that molybdenosis was diagnosed in cattle grazing on forage that was grown in alkaline soils with total soil molybdenum concentrations of between 1.5 and 5.0 ppm. Vlek and Lindsay (1977) found that when molybdenum concentrations (water-extractable) in certain Colorado soils reached 0.5 ppm, the alfalfa growing on these soils had molybdenum concentrations of 30 to 50 ppm. A British study found that when soil molybdenum values averaged 1.6 ppm, herbage (no species given in report) molybdenum values were found to be 20.3 ppm (Davies and Crawshaw, 1978). Another study in India showed that when available molybdenum in soils reached a concentration of 1.0 ppm, cowpeas growing in these soils had molybdenum concentrations of about 200 ppm (Nayyar et al., 1977).

LETTER 25

Molybdenum states very clearly that six parts ppm. or less is beneficial to plant life and about fifteen ppm would create a toxic condition. The EIS in the discussion of this mineral states that materials containing one ppm. could be buried eight feet deep. This seems ridiculous and uninformed.

D Concerning Iron, the use of Iron supplements by intramuscular injection in calves and hogs in this area is a common practice and would lead me to believe that the chance of adverse effects by the intake of too much iron is not a problem. I believe the toxic implications in the EIS should be re-examined and in my opiinion are unduly pessimistic and wrong.

E The only two common toxic conditions that readily occur are Selenimun and Nitrate. There are areas where Selenimun can create a problem but they have always been there and cattle have always used these areas. We see sighs of excess hoof growth and cattle losing their tails. This also happens with Ergot poisoning in grains. I have not encountered either of these conditions in the Tongue River area when cattle have ample feed.

F The Nitrate condition has been observed in native hay and particularly in drought years where it is common to have a high percentage of fire weed. When this hay is fed in heavy quantities, particularity after becoming wet from snow to very hungry cattle, this nitrate condition may become evident. There are some Nitrate consentration on native pastures that retards the assimalation of Vitamin A but this is corrected by Vitamin A injections, which is used as a common practice on many ranches.

G In closing I think the EIS was slanted quite negatively. Certainly if Decker and Colstrip can achieve proper reclamation then Montco will have no problems **because there is not that much difference in the area. I am in favor of the permit for the Montco Mine being granted.**

Very truly yours,

Arthur F. Hayes D.V.M.

President of The Brown Cattle Co.

Research, in short, shows that the availability of soil molybdenum to plants varies significantly, and is dependent on soil characteristics as well as plant species. Soil characteristics affecting molybdenum solubility (and therefore availability to plants) include pH, mineralogy, degree of molybdenum saturation, and the presence of competing anions such as phosphate and sulfate (Reisenauer, 1967; Davies, 1956).

In light of available research, the 1.0 ppm value discussed in the draft EIS appears to be a useful threshold value when legumes are present.

D Thank you for clarifying by phone (June 24, 1982) that you are referring to Mrs. Patty Kluver's public testimony (number 7). Although Mrs. Kluver discusses iron toxicity, the EIS does not. See testimony 7, comment B.

E Thank you for this information.

F Thank you for this information.

G Although both Decker Coal Company and Western Energy have good stands of vegetation in some reclaimed areas, more time is needed before reclamation can be considered successful. The Department monitors upward migration of salts, vegetative diversity, and ability to withstand grazing pressure, among other things, in deciding whether proper reclamation is being achieved.

LETTER 26

DEPARTMENT OF HIGHWAYS

TED SCHWINDEN GOVERNOR
2701 PROSPECT
STATE OF MONTANA
HELENA MONTANA 59620

June 21, 1982

RE: Draft EIS For The
Montco Mine Proposal

RECEIVED
JUN 23 1982
STATE LANDS

Gary Amestoy
Montana Department of State Lands
1625 - 11th Avenue
Helena, MT 59620

Dear Mr. Amestoy:

Thank you for the opportunity to review the above referenced subject.

As you know, access for the workers traveling to and from the mine site would be via Federal-aid Secondary Route 566.

Rosebud County currently has the jurisdiction to issue road approach permits, encroachment permits, and they also have the maintenance responsibilities.

Whenever there is a project of this magnitude, our procedure has been to draft up a "Memorandum of Understanding" which would be signed by the Company proposing the development, the County, and the Montana Department of Highways.

The Memorandum of Understanding outlines what is expected of the Company to maintain the integrity of the transportation system and also informs the Company what the State and County will do. Consummation of the Memorandum of Understanding provides all three parties involved with legal documentation should the question of liability ever occur. The Memorandum of Understanding also compliments procedures of the Department, which requires Federal Highway Administration approval. Since this transportation route is on the Federal-aid Secondary System, completion of this process becomes important.

LETTER 26

Gary Amestoy
June 21, 1982
Page Two

The following will be the Department's response to the Draft EIS.

Even though Montco's plans are now only conceptual, we feel that if and when this project becomes a reality, that the impact to the transportation system would be significant and therefore, needs to be evaluated in much greater detail. Cumulative impacts to the highway system in these coal developing areas need to be thoroughly explored so the Department can implement proper planning procedures.

Sincerely,

James W. Hahn, Chief
Planning & Research Bureau

JWH:DWC:dj:5P

cc: Don Harriott
Homer Wheeler
Robert Champion
Will Hutchinson
Don Gruel
Steve Kologi
Ron Williams
Jay Randall

The impacts to the transportation system were in fact evaluated in much greater detail. Only the conclusions from that evaluation are reported in the EIS. Additional detailed information is available in the Interstate Commerce Commission's EIS on the Tongue River Railroad (ICC, 1983).

LETTER 27

June 28, 1982

Mr. Gareth Moon
Department of State Lands
Capitol Station
Helena, MT. 59620

Dear Mr. Moon:

I have reviewed the Montco Draft Impact Statement and have the following comment. I operate a small business in Ashland. The operating of a mine near Ashland would help create some positive growth in the town.

The Impact Statement mentions the Coal Creek mine and the sawmill as providing jobs for people from the area. It should be pointed out that both of these operations have been shut down and it does not appear that they will be re-opened. We are in need of job opportunities and increased business in Ashland, permitting the mine will help provide these things.

Thank you for considering these comments.

Sincerely,

Del Holmstrom

Del Holmstrom
Owner of
Dell's Towing & Repair

Thank you for commenting.

LETTER 28

MONTANA HISTORICAL SOCIETY
HISTORIC PRESERVATION OFFICE
225 NORTH ROBERTS STREET • (406) 449-4584 • HELENA, MONTANA 59601

June 25, 1982

Gareth Moon, Commissioner
Montana Department of State Lands
1625 Eleventh Avenue
Helena, MT 59620

Dear Mr. Moon:

Re: Montco Coal Mine
Draft E.I.S.

Thank you for the opportunity to comment on the above-named document. My comments will address 3 points on table II-27, page II-86.

First, I believe the columns beginning with "Integrity of Location" and ending with "Integrity of Association" should be removed from the table. The evaluations contained under the six headings are inaccurate, contradicting, misleading, and to my knowledge were not used in determining the eligibility of these sites for listing in the National Register. Second, I believe site number 24RB231 should be changed to 24RB223. Finally, I don't believe the evaluations in the final column are accurate for sites 24RB230, 24RB212, 24RB217, or 24RB223 (24RB231). In each case the evaluation is "yielded and will yield."

Sincerely,

Marcella Sherfy

Marcella Sherfy
Deputy SHPO

TAF/det

Thank you for your comments. See text change, table II-27.

LETTER 29

RECEIVED
[illegible] 6 1982
STATE LANDS

June 30, 1982

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena, Montana 59620

Dear Mr. Moon:

I am submitting my comments in regards to the Montco Draft Environmental Impact Statement. I was not able to attend the public hearing your office held in Ashlsnd but I have reviewed the Statement and discussed it with other people in the Ashland area.

I operate a buisness in Ashland. The opening of a mine in this area would contribute a great deal to the economy of Ashland. There is now a lot of unemployment in Ashland since the closing of the Coal Creek mine and the sawmill. The mine or mines would help in lowering this unemployment and at the same time stimulate the expansion of buisness and services in Ashland.

I support the permitting of the Montco mine. Thank-you for providing me with the opportunity to submit my comments.

Sincerely,

Dale Hofmann

Thank you for commenting.

LETTER 30

RECEIVED
JUL 6 1982
STATE LANDS

July 2, 1982

Mr. Garth Moon
Commissioner of State Lands
Capitol Station
Helena, Montana 59620

Dear Commissioner:

I have lived in the Ashland area all my life and operated a buisness in Ashland for some time. I am submitting thses comments in regard to the Montco mine for which your office recently held a public hearing in Ashland.

As with other small towns in Montana, Ashland has not shown much growth in the past years. Recently the Coal Creek mine and the Ashland sawmill have gone out of buisness. This has added to an already high unemployment rate for this area. The permitting of a mine and opening of the mine would be a welcome site to a majority of the people in Ashland.

The mines which have been opened in the area, such as Colstrip and Decker, have proven that the land can be reclaimed to be as productive or more productive for cattle grazing than the land was before mining. These operations have also shown that the effects to wildlife are not as great as some people thought it would be.

The revenues which the mine would provide to the State through the coal severance tax and other taxes would provide for funding to solve the biggest majority of the socio-economic problems which might occur. The Montco mine should be permitted in order for the Ashland community to expand and prosper.

I appreciate your reviewing and considering these comments.

Sincerely,

Edward M. Hanson
Box 228
Ashland MT

Thank you for your comments.

LETTER 31

MONTANA CHAMBER OF COMMERCE
P O BOX 1730 • HELENA, MONTANA 59624 • PHONE 442-2405

RECEIVED
JUL 2 198
STATE LANDS

July 1, 1982

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena, MT 59620

Dear Mr. Moon:

This letter is written to encourage prompt issuance of the permits necessary for the Montco Mine in Rosebud County.

When some Montana counties are suffering from unemployment rates as high as 35%, the opportunity for increased employment anywhere in the state is a welcome one.

As a natural resource state, Montana will see its future in careful resource development. Montco is to be congratulated for the consideration and effort that have gone into their planning for this mine. It is evident the company plans every reasonable effort to ameliorate potential adverse impacts of mining.

It is also apparent from the draft EIS that the Montco Mine is one that can be developed with minimal adverse impact and many benefits. It is in a county that has already adjusted to energy development and will provide employment in areas suffering declining agricultural employment.

By being in a sparsely populated area, although it may create some temporary difficulties for housing, the mine will have less negative impact than if it were near a major population area.

We are concerned about the long list of mitigating actions suggested against possible adverse impacts. This mine will be paying more than $500 million in state taxes. Further, mitigating adverse impacts is the intent of the 30 percent coal severance tax. If there is to be energy development, there must be some impacts.

Plans for rail development will be beneficial in the future not only for energy development in an energy-rich area, but for the future of the area as a whole.

Thank you for commenting.

LETTER 31

Mr. Gareth Moon
July 2, 1982
Page 2

The draft EIS states the schedule is already off one year. Further delays should not be necessary. Promptly issuing the necessary permits for the Montco Mine would, in the opinion of the Montana Chamber of Commerce, be in the best interest of the people of the state of Montana.

Sincerely,

Forrest H. Boles
President

LETTER 32

RECEIVED
JUL 2
STATE LANDS

June 28, 1982

Mr. Gareth Moon, Commissioner
Department of State Lands
1625 Eleventh Avenue
Helena, MT. 59620

Dear Commissioner Moon:

I would like to comment on the Draft Environmental Impact Statement for the Montco mine. Unfortunately, I was not able to attend the hearing in Ashland but have talked to some of those people who did. I understand that the Northern Plains Resource Council presented nothing but negative comments. However I also understand that a majority of the people present were for development and mining. I would like to give you my feelings on the DEIS and the feelings of this community.

A First of all, the DEIS makes it sound as though most of the ranchers in the Birney area are against mining. From my conversations and knowledge this is not true. A majority of the ranchers have made coal commitments or are willing to do so. Those few who haven't are either members of the N.P.R.C. or don't have any coal. I think the general feeling is that the N.P.R.C. is against any development and could care less about the economy and well-being of other citizens. Ranching in these parts has been tough and has not provided enough family security and stability. Our young people leave the area because there are no jobs and because the ranches can't support them all. We need development and jobs or this area will not grow.

B Secondly, this area has minimal educational and social services. The kids have to travel great distances to go to high school. The same thing can be said for other services. I think developmnt would help stress these needs and provide for proper services.

C Third, the apponents of mining always argue that reclamation cannot be a success. Why are these people and the DEIS allowed to ignore that reclamation does work? Look at Decker and Colstrip. The mining companies have people with experience and knowledge and who want to do the best job. The hear-say of the anti-developers is not based on any scientific knowledge. A lot of this land is now very marginal and reclamation would probably benefit a majority of it. The landowners should be the judge of this, not special interest groups and bureacrats.

D Fourth, those who appose (both within and outside of the area) development appear not to believe in the free-enterprise system. The country was built on this system and I find it hard to accept that these people want to control my life style and well being.

A When a sample of all Ashland-Birney area residents were asked whether they support or oppose a coal mine between Ashland and Birney, 38 percent were in favor and 40 percent were opposed (page II-63 of DEIS). Percentages for ranchers were not computed separately from other residents.

B Your comments are noted.

C Please see letter 25, answer G.

D Thank you for your comments.

LETTER 32

I am in favor of the Montco mine and would hope that the State uses a rational and positive approach in its' decisions.

Thank you for the opportunity to comment.

Sincerely,

John W. Moreland

Pres. Moreland Sheep Mountain Ranch inc.

LETTER 33

July 3, 1982

RECEIVED
JUL 2
STATE LANDS

Mr. Gareth Moon
Department of State Lands
1625 Eleventh Avenue
Helena, MT. 59620

Dear Mr. Moon:

Please consider these comments in response to the Montco Draft Environmental Impact Statement. In reviewing the Impact Statement there seems to be considerable concern about impacts to wildlife and the land in general.

I have lived in this area for some time and have driven by several of the mines already here. Based on the wildlife that I see around the operating mines, I think the impacts to wildlife are exaggerated in the DEIS.

It also seems that the mines have done a good job of reclaiming the land after mining. I have been in the area where Montco plans on mining and there are places that are steep and rough without much grass. After seeing the reclaimed areas at Colstrip and Decker it looks like the land will be more productive after mining.

I know that deer and coyotes spend a lot of their time in rough country, but there will be plenty of areas for them to live in.

My last comment is this. I opperate a small buisness in Ashland now, for that business to grow or continue to prosper, there is a need for some kind of development. This will help me as well as other businesses and unemployed people in the area.

Thank you for considering these comments.

Sincerely,

Carl Lenyack

Thank you for commenting.

LETTER 34

RECEIVED
JUL 2 1982
STATE LANDS

June 28, 1982

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena, Montana 59620

Dear Mr. Moon:

I am submitting these comments in response to the Montco Draft Environmental Impact Statement and the public hearing recently held in Ashland. I was unable to be at the hearing but have discussed it with other people from Ashland.

It seems that several individuals who testified at the hearing commented on the social and economic impacts that opening of the Montco mine would create.

I operate a business in Ashland and would like to expand it someday. I am also considering building an apartment housing complex on property which I own in Ashland.

In order for these plans to occur it will be necessary for some development in the area.

The Montco mine and other mines will create new jobs and improved services along with an improved local economy.

It's true that development will bring more people and demands on services but with careful planning and wise use of severance tax money these problems can be handled.

I favor permitting of the Montco mine.

Cleatus G. Stevenson

Sincerely.

Owner
Just Us Inn
Ashland, MT
59003

Thank you for commenting.

LETTER 35

July 2, 1982

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena, MT. 59620

Dear Commissioner Moon:

I am submitting these comments in response to the Montco Environmental Impact Statement and the public hearing recently held in Ashland. I was unable to attend the public meeting, but have looked over the Impact Statement and visited with others who did go to the meeting.

I operate a business in Ashland and am concerned with the comments in the EIS about the Ashland community. The Coal Creek mine and the sawmill have both gone out of business creating unemployment in the area. The operating of a mine near Ashland would provide jobs for these unemployed. In addition the town would be able to expand with the new people moving in. Not only would this help my business but it would also hlp other businesses and provide for new services to move into Ashland. Some of these, which Ashland does not have now, would be medical services, recreational activities and increased educational facilities and services.

With new people moving into the area the existing services will need to be improved or expanded. The impact statement estimates that about $570 million of revenue will be paid to the State during mining. This revenue if allocated correctly by the State will provide money for improving existing or constructing new services for the people.

I feel the Montco mine should be issued a mining permit. Thank you for considering these comments.

Sincerely,

Thank you for commenting.

LETTER 36

Railroad and Telegraph
Sheridan, Wyoming

Quarter Circle U Ranch Co.
BIRNEY, MONTANA 59012

Area Code 406
Phone ~~[illegible]~~
984-6233

June 30, 1982

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena, Montana 59620

Dear Commissioner Moon:

My principal interest in making a statement regarding the proposed Montco Mine is that our ranch, the Quarter Circle U, owns fee coal acreage and the third water right on Tongue River. Our family has ranched on this land for 100 years, and during my life-time (80 years) the productivity has continued to improve. Much of this improvement in productivity of late is the result of money generated by coal leases.

We are fortunate in this area to have many of the trace minerals that are beneficial and needed by livestock found in the soils and water to the extent that these trace minerals do not have to be supplemented-Phosphate, Calcium, Manganese, Zinc, Sulfur, Copper, Cobalt and Sodium.

By stockpiling topsoil to use as a seedbed after mining most any kind of forage can be grown on these reclaimed mining areas. Especially the wheat grasses. Even highly sodic soils can be mixed with rich topsoils and made to produce more forage than before mining.

It should be noted that some extremely alkaline soils do not produce much to begin with, so there is nothing to lose and much to gain.

Also let's consider the water problem. We ranchers know, through years of experience, that the groundwater table varies with the weather. We know that the water in wells varies from wet years to dry years. We know that some intermittent streams become dry after a series of dry years and have become running streams after a series of wet years.

Thank you for commenting.

LETTER 36

The aquifers along the Tongue River valley generally run down-stream through the gravel seams of old river channels or come out in springs along the river banks where a coal aquifer has been washed out by stream flows.

The present strip-mining laws prohibits mining of alluvial valley floors. Mining outside the alluvial valley will not affect the hydrology of Tongue River.

I firmly believe that the proper development of our natural resources is a necessary step that must be taken for the benefit of individuals, local governments for an increased tax-base, for Montana's severance tax and finally for the Federal governments royalty income.

Thank-you for providing me with the opportunity to submit these comments.

Sincerely,

Burton B Brewster

LETTER 37

JUL 10 1982

Busby, Montana
July 7, 1982

Department of State Lands
1625 11th Avenue
Helena, Montana 59620

To whom it may Concern

I submitted A Testimony ON October 21, 1982 AT Ashland Public school for A Hearing ON Tongue River Proposal Montco mine –

In my Testimony I strongly question the Land AND water Rights of the Cheyenne Nation who settle on The East Side of Tongue River. Cheyenne Nation And its People settle where The Proposal Nances family mine is being question.

Cheyenne Nation And its People still question The Deals made by federal Government That BIA

Between 1884 And 1900 in making And forming of the cheyenne Reservation As it is know Today. These Raw Deals were made by The B.I.A.

Cheyennes were Paid A 25.00 Per faimly To move back on the West Side of Tongue River Also in verbal And oral under Standing through the B.I.A. that the Cheyennes Would Always Moved Back ON The East Side of Tongue River Whenever They as one Nation would see the Need And fit As they were Told the Land, Water And minerals were their As they settle first.

Thank you for your comments. You indicate that the Northern Cheyenne have a claim to the land and water on the east side of the Tongue River and no permit should be issued until the title is cleared. However, the court system, not the Department of State Lands, is the proper forum for the adjudication of title to land and water.

Today cheyennes like myself question the so-called Deals by our Great White fathers in Washingston And U.S. Congress I question the Treaty of 1825 Treaty of 1851, Treaty of 1868. These Treaties Were made in good faith by the Heads man of cheyennes Militay Societies the Chiefs Act As the Spokemen for The People.

There was 56 families who settle on the East side of Tongue River, the Land Title should be clear before Any mining is done. Also the cheyenne Tradional Government has To be invoked As The Montco mine will Affect the cheyenne People.

The cheyenne Tradional Government And its Societies have questions And can define the Area As Scared To their Ways of Lives.

My own real Concern Now what has happen To my Grand-Mother Land, Mrs. Cord Little Sun. And other 55 families who still own And claim the land, water And minerals Rights;

My question Now is Do the Indians have Any Rights here in America.

Wayne Little Whiteman
Member Elk Horn Scarper Society
And Interpreter

Box 53
Busby, Montana 59016

LETTER 38

July 1, 1982

RECEIVED
JUL 7 1982
STATE LAN

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
1625 11th Avenue
Helena, Montana 59620

Dear Mr. Moon:

This letter is in regards to the recently completed Draft Environmental Impact Statement for the Montco Mine. I have lived and ranched in the Ashland-Birney area all of my life and in the King Creek area 25 of those 56 years. In reviewing the DEIS, I would like to submit the following comments.

A On page III-18 of the Impact Statement, it is stated that at least four wells (Numbers 30, 33, 57, and 84) would be removed by mining. I would like to say that wells 33 and 57 have not been used for close to 10 years and would probably require a lot of repair in order to be useable. Well 84 has been abandoned for more than 30 years and shouldn't be considered a well. Well 30 is according to Montco's mine plan, not to be disturbed by mining. In addition, the well is over 600 feet deep which according to Montco is below the coal seams to be mined and above the Hell Creek formation which will possibly be used for a mine-water supply.

B Also, beginning on page III-33 of the DEIS, the impacts to wildlife are discussed. After having driven by the Decker and Colstrip mines, it seems that the impacts to wildlife are greatly exaggerated in the DEIS. At these mines, the presence of people, machinery, and noise does not seem to affect the wildlife. In fact, workers from Colstrip have told me that a lot of wildlife lives near or in the mine.

I believe the mine should be permitted as it would also decrease this area's unemployment and improve business and services in the area.

Thank you for considering these comments.

Sincerely,

McKelvey

A Your comments are noted. Thank you for this information.

B Comment noted. Thank you.

LETTER 39

RECEIVED
JUL 7 1982
STATE LANDS

July 5, 1982

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena, Montana 59620

Dear Mr. Moon:

I am writing in regards to the Montco Environmental Impact Statement which your office has prepared. I am currently employed as a cat operator at the Colstrip mine. I live in Ashland and commute to Colstrip each day.

Opening the Montco mine would eliminate my driving the 45 miles to work each day by creating job openings closer to my home. There are other people who are in the same position as I. The development which would occur in Ashland would be a welcome change to the majority of people who live in the town. There is now several people who are unemployed and the services, such as medical and shopping are not available. These would surely improve with the opening of a mine near Ashland and the related growth which would occur.

I appreciate your considering these comments and believe the mine should be permitted.

Yours truly,

Thank you for commenting.

LETTER 40

RECEIVED
JUL 7 1982
STATE LANDS

July 3, 1982

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena, MT. 596 0

Dear Commissioner:

I have attended several of the meetings which have been held in Ashland and most recently the public hearing on the Montco mine being developed south of Ashland. I live and ranch near Ashland.

At these meetings the general consensus seems to be that all the people in this area are against any kind of development. This is not the case, there are many people who feel that development would benefit the area. Recently the Coal Creek mine has gone out of buisness. This was not because of there failure to lease federal coal but because the market has failed. The closing of the mine created unemployment. The Ashland sawmill has also gone out of buisness and created more unemployment for this areas people. The area needs jobs and new services.

I have followed the progress of the Montco mine and attended several meetings as I said earlier. It seems that the mine has done a good job of preparing their project and in reading the Impact Statement it looks like the mine can be reclaimed according to the regulations. The socio-economic problems in the EIS can be solved and people in Ashland are ready to help. The severance tax money to be paid by the mine should provide the necessary funding for handling these impacts.

I support your offices permitting of the Montco mine and appreciate your accepting my comments.

Sincerely,

C. H. Tarter

Thank you for commenting.

LETTER 41

JULY 7, 1982

RECEIVED
JUL 7 1982
STATE LANDS

DEPARTMENT OF STATE LANDS
1625 ELEVENTH AVENUE
HELENA, MONT. 59620

Dear Sir:

We are ranchers living 3 miles East of Ashland, Mont this ranch is one of the few that will be greatly affected by the Montco mine, the Railroad associated with the mine will put us in a Y; We are willing to live with this as we believe in progress and the fact that Eastern Montana is a depressed area and needs the income the mine will bring in.

We would like to see orderly growth in this area and started a subdivision called Otter Creek Hills; Otter Creek Hills has 58 housing sites, all are a acre or more and a trailer court with 88 hookups; because the Powder River County Commissioners did not want a water and sewer district this far from Broadus, and would not allow individual wells, we had to own the water and sewer; This has been a large under taking and a financial burden to us.

Their are many people in this area willing to work for orderly growth and a raising economy.

Putting the Montco mine in operation would be an ideal way to see what happens to the water e tc; You can study for years but unless you do something with the study you cannot learn.

Your comments are noted. Thank you.

LETTER 41

The American people are great inventors, and they learn by doing, what a great opportunity for the Department of State Lands to be the fore runners in putting their studies to use.

Sincerely
Jackie Trusler

Jackie Trusler
Box 6
Ashland, Mont. 59003

Telephone: 784-2551

LETTER 42

WESCO resources, inc.
406-252-5695 ☐ 1500 POLY DR. ☐ SUITE 250
P.O. BOX 1181 ☐ BILLINGS, MONTANA ☐ 59103

June 25, 1982

RECEIVED
JUN 28 1982
STATE LANDS

Mr. Gareth Moon, Commissioner
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59620

Re: Comments on MONTCO Mine Draft EIS

Dear Commissioner Moon:

On behalf of Wesco Resources, Inc. I would like to commend your department and staff for the effort you have made to assemble the MONTCO Mine draft EIS. As a general statement, Wesco supports the issuance of the mine permit.

Having been at the public meeting held in Ashland on June 3, 1982, I do have some specific comments.

1. It was alleged by Wallace McRae that MONTCO was responsible for shutting down Coal Creek Mining Company operations. Later in public testimony, Patty Kluver made the same accusation about Wesco Resources, Inc. In either case I do not accept these allegations. By Coal Creek Mining Company's own admission, they have shut down their operation because the bentonite industry which they depend upon for coal sales is 50 per cent of what it was in 1981. MONTCO was not the apparent successful bidder on the Coal Creek Small Business Set Aside tract, and therefore could not have been responsible for shutting down Coal Creek as was also alleged. How an additional 60 million tons of coal would have kept Coal Creek Mining Company in business is incomprehensible to me, when they can't sell what they now have.

Your comments are noted. Thank you.

2. Another allegation by Wallace McRae was that MONTCO opposed the 30% coal severence tax levied by the State of Montana. I believe this to be an inaccurate statement. To our knowledge, MONTCO has publicly stated that it would like to have the privilege of paying the severence tax.

3. When the Northern Cheyenne Tribe has been paid in excess of $100,000 to examine the socio-economic impacts on the Northern Cheyenne Reservation by MONTCO's proposed coal

LETTER 42

Mr. Gareth Moon
Page 2
June 25, 1982

development, I find it contradictory for members of the Tribe to criticize the adequacy of their own work.

4. Another concern raised at the public hearing centered around the present lack of a coal market. Some commentors felt that the mining permit should not be issued because there was no demonstrated present coal market for MONTCO's coal. I do not believe that this is an issue that the Department of State Lands (DSL) can address and is outside the scope of the DSL's work. Furthermore, in my opinion, those who advocate the denial of the MONTCO mining permit can rest at ease because I don't believe MONTCO or any other coal company will invest in excess of 100 million dollars for a mine and facilities when the product cannot be marketed.

Hopefully, the above comments will help dispell some of the mis-statements that surfaced at the June 3, 1982 public hearing. Wesco Resources, Inc. supports the issuance of a mining permit to MONTCO. Wesco further believes that MONTCO has complied with the State and Federal requirements and that the decision to complete the issuance of the MONTCO permit should be made expeditiously.

Thank you for the opportunity to offer these written comments.

Yours very truly,

Steve Elliot

SME:ew

LETTER 43

July 4, 1982

RECEIVED
JUL 7 1982
STATE LANDS

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena. Montana 59620

Dear Mr. Moon:

After attending the meeting in Ashland and reviewing the Draft EIS for the MONTCO mine I feel compelled to make a few brief comments concerning both.

Wally McBae and company at the Ashland meeting made comments to the effect that permits should not be issued due to the lack of a viable market. This is the most amazingly absurd arguement I have ever heard. Evidently the free enterprise system is to be used for those endevors which the NPRC and Tri-County feel are worthy. I certainly hope that you never issue grazing permits based on the cattle markets. Mr. McBae also made comments to the effect that Colstrip should mine all of the coal destined for MONTCO and that was really no need to open any new mines. This arguement follows the same rocky road as his his earlier idea. I wonder how Mr.McBae would feel if the State Lands Department, the BLM, BN and others, decided to let the ranchers in Birney have the only grazing leases issued because they felt there was no need to let anyone else grow beef. I doubt he would like that idea.

When all of the NPRC/Tri-County remarks are boiled down, and all of the contridictions rise to the surface, the intents and motives of these groups are clearly visible. I consider them now and have always considered them to be nothing mone than obstructionists. To think of them as emvironmentalists is a great injustice to the word. NPRC has taken laws, which were passed to protect and enhance the environment, and used them to halt,delay, and otherwise harass every energy project in the West. Colstrip 1-4 is a prime example of which I know you are aware. The danger in allowing these laws to be missused is that a law may be thrown out because it simply stoped everything it was ment to control.

The danger I see in all of this with regards to your job is that if you don't consider the source, and allow NPRC comments to sway your decisions, where that is allowed by law, you will be endangering those laws which I spoke of above. Again, and very simply put, if evvironmental laws are used to obstruct and delay, at some point they will be done away with altogether.

Thank you for commenting.

LETTER 43

July 4, 1982

D I also heard comments at the Ashland meeting about mitigating socio-eco problems. People seem to expect the coal industry, which is the most heavily taxed industry I know of, to resolve all of these so called problems before proceeding. The Draft EIS stated that the State of Montana would receive about six hundred million dollars over the life of the MONTCO project. Ihave been under the impression that the coal tax was passed for the purpose of resolving impact problems and if this is not the case I for one would like to know it.

E Last but not least I would like to say that MONTCO has exhibited to me, both through the Draft EIS and my direct knowledge of their activities in the Birney-Ashland areas, that they are truly concerned with the communities in which they operate and with the environment which we all share. I feel they have done a outstanding job and that they would be of great benifit to The State of Montana. You might also gather by now that I would much rather have MONTCO for a neighbor than NPRC.

Sincerely, Jay Nance
Jay Nance
Birney, Mont.
59012

LETTER 44

RECEIVED
JUL 7 1982
STATE LANDS

June 3, 1982

I am Keith Powell, a rancher and irrigator in the lower Tongue River Valley.

A I think, for the State of Montana, and for the Nation, the most important and most basic issue here is the need for this mining. I think it is ridiculous that the need for this coal isn't the first issue.

A Thank you for your comments.

My concern is that this project could be started and then go "belly-up". Construction could start and condemnation could take place to build the rail bed. But it is very likely that this project will never become fully operational and will provide no benefits for its investors, other than tax decuctions. The news provides plenty of examples of this quick boom and soon bust situation.

Exxon's Colony oil shale project in Colorado was recently written off because costs have more than doubled. It was their decision to cut their losses. With the absence of a market or any likely market over the next 20 years, it was financially a very poor venture. Over 2,000 people were laid-off over night.

Occidental Petroleum and Tenneco delayed their shale development near Cathedral Bluffs. Gulf and Standard Oil have put off commercial development at Rio Blanco, Colorado.

Bonneville Power Administration has recently received a consultants report that predicts a much lower growth rate of Electrical consumption in the Northwest.

This report made by Energy Ventures Analysis Inc., says the Northwest demand for electricity will remain flat for the eighties and have an annual growth rateof 1.2 percent through the early 1990's.

This consulting firm's report also states that "rapidly escalating prices" will result in major conservation by energy users.

The firm goes on to say if power use levels off, planned and partially completed nuclear plants may not be necessary.

Certainly the WPPSS fiasco is evidence of overly optimistic projections of energy use and has resulted in extremely excessive increases in electrical costs to power users of the area

(more)

LETTER 44

Powell--2

It is quite apparent that the bust could come here, too. These projects were born in the same era. Their failure is not so much a result of a weak economy, but instead is a result of unrealistic and poorly planned efforts to supply energy.

B The assumption seems to be that if investors are willing to put up the money for the development, they should be allowed to measure and take their risk and be subject to the economy. If the project fails, it's their loss.

This argument doesn't work here. Strip mine siting is a public issure, not a private one. The long list of serious and costly impacts to soils, water, education, housing, community services and local government put the MonCo Mine issue squarely in the center of public policy.

Impact issues are issues for the people of Montana and of the Tongue River Basin, not Diamond Shamrock Corporation or Washington Energy Company.

C Certainly the opening of several mines in the area and the construction and operation of 90 miles of railroad in the valley are extremely incompatible with the basic foundation industry of Montana.

D Montana reclamation law provides seven reasons for which DSL could deny the permit. These conditions are present throughout the mine area. Impacts on groundwater are not clear. Aquifer areas apparently won't be buffered from unsuitable material and this could degrade groundwater quality even more than expected. Increased industrial water withdrawals from the Tongue River could result in low flows much more severe than those modeled, with serious impacts to irrigators. Similar questions about the severity of impacts and reclamation failure will be raised tonight, and in written comments.

My point is that DSL has many indications that this mine permit should be denied.

E I think the Department is also aware that the controlling interest in this mine development is held by the Diamond Shamrock Corporation. Through its Falcon Coal and Hawkeye Coal subsidiaries, Diamond Shamrock has a long history of stripmine rule violations in the eastern states. Their track record doesn't look good.

F The Montana Environmental Policy Act declares that it is the policy of the state, in part, to foster and promote the general welfare and to fulfill the social, economic and other requirements of present and future generations of Montanans. To carry out this policy, it is essential to address the issues of industrial siting in broad terms and reject the notion of granting permits in a vaccuum.

(more)

B Please see answer C to your testimony (number 9).

C Comment noted.

D Your comment is noted. Industrial withdrawals were incorporated into the Woods (1981) model for the Tongue River, Montana, Petition Evaluation Document (DSL and OSM, 1982). The scenarios in that document assume the worst of circumstances: intensive mining in the Tongue River valley, the development of a coal-fired generator, municipal withdrawals, a coal-gasification plant, and increased irrigation along the Tongue River.

Additional computer simulations were also made for this final EIS. (See chapter III.) See also letter 9, answers C and D, and testimony 8, answer G. However, industrial withdrawals of any kind from the Tongue River were not analyzed in the most recent computer simulations because of the lack of water in the present Tongue River Reservoir project.

E Comment noted.

F Comment noted.

LETTER 44

Powell--3

Based on the Environmental Policy Act, I think that DSL should address the impacts of the real possibility that this mine and railroad might be built and then go under.

G In the interest of that which is best for Montana, I feel that this additional area of the Tongue River Valley should not be opened to industrial development.

Now is not the time.

End

G Appendix 9 has been added to the final EIS to discuss mine closure or failure.

LETTER 45

WETA

Western Environmental Trade Association

2301 Colonial Drive - Helena, Montana 59601
Phone (406) 443-5541

OFFICERS
Dave Johnston, President
Int'l Union of Operating Engineers,
Local 400 AFL CIO
Joe Crosswhite, President Emeritus
Int'l Union of Operating Engineers,
AFL-CIO, Retired
Cecil Williams, Vice President
Joint Council of Teamsters
Dennis Shea, Secretary-Treasurer
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James Mockler
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Lewistown Montana
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Local 206, AFL CIO
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Montana Power
Allen Shumate
Helena Mont
James P Sieverson
ASARCO
Nina Smith
Montana Snowmobile Assn , Inc
Gene Spilde
Ovando Mont
Norman Starr
Melville Montana
Jim Williams
Williams Construction Company
Russ Williams
Int'l Brthd of Electrical Workers, AFL CIO

RECEIVED
JUN 30 1982
STATE LANDS

June 30, 1982

Mr. Gareth Moon, Commissioner
Department of State Lands
Capitol Station
Helena, MT 59620

Dear Gary:

The Western Environmental Trade Association appreciates the opportunity to comment on the Draft Environmental Impact Statement on the proposed Montco Mine, Rosebud County.

WETA's principal purpose is to promote orderly economic development while protecting our environment in a reasonable way. The proposed Montco Mine represents a total projected revenue source to the State of over $500 million. In addition to this projected State income, over 500 new jobs would be created resulting in an annual payroll of approximately $17 million. The additional jobs and the tax base would not only benefit Eastern Montana but also the remainder of the State. In light of these economic benefits and the gloomy economic picture in Montana, the Department should be cognizant of the urgent need to utilize a rational and positive approach in rendering State decisions.

We realize that actions on proposed development must be balanced between environmental and economic considerations. In reviewing the measures taken and the studies completed by Montco we feel they have demonstrated this approach and have shown that successful mining and reclamation can be accomplished. These facts have also been substantiated by other agencies and the results of the Tongue River Unsuitability Petition. The decision rendered on the Petition did not find the area unreclaimable nor the water quality to be detrimentally affected.

In conclusion, we feel the additional new jobs and tax base which would result from the development of the Montco Mine would be a great asset to our State, particularly in these times of economic distress.

Sincerely,

Pete

Peter V. Jackson
Executive Director

PVJ/bmo

Thank you for your comments.

LETTER 46

RECEIVED
JUL 9 1982
STATE LANDS

Art Hayes Jr.
R Bar Ranch
Birney, Mont.

Department of State Lands
Helena Mont.

Re: Montco EIS

Dear Sir:

As I have previously stated at the public hearing on the Montco EIS, reclamation in this area will not work for the following reasons:

A 1. High levels of salts, sodium, toxic trace elements and clays with a very shallow soil cover.
B 2. The use of a color coding technique that has never been tried. The color of soil will change depending on the amount of moisture on it or in it.
C 3. Montco's lack of overburden content as shown in the EIS.
D 4. The lack of favorable overburden for a buffer for the aquifers.
E 5. The relocation of the county road and the railroad loop will be in the Tongue River flood way and will act as a dam to the river.

Very Truly Yours.
Art Hayes Jr.
Art Hayes Jr

A Montco has revised its plans for both overburden and soils. Please see chapter III of the final EIS, revised to reflect the latest revisions in Montco's permit application.

B Montco no longer plans to use color and lithology to separate overburden in the field. These parameters were used, among others, to develop the isopach maps. See chapter III, Geology, for an analysis of the current plan.

C Please see text revisions, chapter III, Geology.

D Please see chapter III, Hydrology, where the analysis of impacts to water quality has been expanded. See also testimony 8, answer G.

E Please see letter 48, answer TTT.

LETTER 47

July 8, 1982

RECEIVED
JUL 12 1982
STATE LANDS

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena, Mt. 59620

Dear Commissioner Moon:

I would like to comment on the recently completed Montco Draft Environmental Impact Statement. I have lived in the Birney area allof my life.

In 1974 we entered into a surface agreement in regards to coal development on our property. No fee coal is involved in that agreement. It is now held by Montco. At that time I felt, with close cooperation between the coal developers and the surface owner, mining and ranching are compatible.

Because the surface involved was being used for agriculture, a cow calf livestock operation, I felt agriculture should remain the primary long term use for all of the area.

I feel the DEIS in general maintains the idea of agriculture being the main use of the land.

I have a specific comment directed to page 111-74 which discusses land use after mining. I agree with the assessment that post-mining reclamation productivity could be greater than before mining.

I participated on Montco's reclamation team in developement of their reclamation plan. This included input concerning selection of plant species to be planted during reclamation. stockwater locations. fence relocations, etc.

I appreciate having had an opportunity to contribute to the reclamation plan.

I do have a concern regarding my position as the owner of the surface in and around the mine area. I have stated before that the primary use of the land is livestock production. Because of this I feel any land use decisions regarding land not in the actual mine permit area must be made with my input based on how it might affect my ranching aperation.

I presently serve on the Ashland School Board. Our biggest problem in school operation is a very low tax base coupled with an unstable enrollment brought on by lack of job opportunities and no stable industry other than agriculture in the area. The Montco Mine would add to the tax base and the long term job opportunities would help stabalize the enrollment. With developement in the area there is also

Your comments are noted. Thank you.

the possibility of the construction of a high school in the Ashland area. At present the high school students must be bussed to neighboring high schools or board away from home. Our own children are faced with a daily 100 mile round trip to attend high school.

E Developement will improve services and economic growth in the area. It will also give the young people of our area the opportunity to work and live here rather than leave due to lack of job opportunities. My support of the permitting of the Montco Mine goes far beyond my position as a surface owner involved with Montco,

Sincerely,

Jack Knobloch

Jack Knobloch
Rancher

LETTER 48

NORTHERN PLAINS RESOURCE COUNCIL

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JUL 12 1982
STATE LANDS

July 8, 1982

Commissiner Gareth Moon
Department of State Lands
1625 Eleventh Ave.
Helena, MT   59620

Dear Commissioner Moon:

Please accept the enclosed comments on the proposed Montco Mine Draft Environmental Impact Statement.

We appreciate the extended opportunity to comment on the DEIS.

Sincerely,

Margie

Margaret E. MacDonald
Research Coordinator

LETTER 48

INTRODUCTORY COMMENTS ON THE MONTCO MINE DRAFT EIS

The most astonishing feature of the Montco Mine Draft EIS (DEIS) is the dearth of substantive information on the proposed mine plan and operation and its relationship to the physical and human environment of the area. This lack of specificity directly reflects the overwhelming deficiencies of the proposed reclamation plan and permit application. The comments that follow will detail numerous deficiencies in both the DEIS and the permit application. Additionally, these comments identify critical obstacles to the overriding statutory requirement that reclamation must be affirmatively demonstrated by the applicant.

A Despite the 18-month interval since Montco submitted its application to the Montana Department of State Lands and two deficiency letters to the applicant, the application remains inadequate under the laws and rules of the State of Montana. For these, and the reasons detailed in our comments, the application should be returned to the applicant. While we recognize the utility of the deficiency letter process that the Department has developed over the past ten years, we believe that there will be instances in which an application is so overwhelmingly deficient that it is not the responsibility of the State to, in effect, prepare a mine plan for the applicant. After 18 months of a good faith effort on the State's part to remedy the deficiencies of this mining and reclamation plan, we submit that it should be returned to the applicant with an inventory of deficiencies -- some of which will be identified in comments on the DEIS and will not yet have been brought to the attention of the applicant. The Montana Strip- and Underground Mine Reclamation Act, Section 82-4-231 (2), provides the authority to return an application.

Alternatively, the State may formally deny the permit to mine based on the failure of the applicant to affirmatively demonstrate that reclamation can be achieved. We emphatically argue that it is beyond the scope of the State's responsibility to continue to waste its limited staff and financial resources on such an incomplete permit application.

If the Department does not send the application back or deny the permit, it should be ready to prepare a supplement to the Draft EIS if and when the Montco Mine application is completed. The Montco Mine DEIS is premature at this time because so much of the critical information is absent.

We welcome, however, the opportunity to contribute our comments at this time. Although the deficiency letter process is useful to the State in setting up a forum to negotiate with mine applicants, it effectively excludes the public from a timely and substantive role in this dialogue. The DEIS, premature though it is, has at least afforded the

A No supplemental draft has been issued. To quote the Department's letter to you of August 30, 1983:

Rule 16.2.609 ARM states:

(1) The department shall prepare supplements to either draft or final environmental impact statements if:
- (a) the department or the applicant makes substantial changes in the proposed action; or
- (b) there are significant new circumstances, discovered prior to final agency decision, including information bearing on the proposed action or its impacts, which change the basis for decision.

The Department's determination based on a review of the responses...is that neither of these conditions have been met, and therefore a supplemental draft EIS will not be prepared.

See also testimony 1, answer A.

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opporunity for many of the affected parties to present concerns and identify critical issues that the State has not yet addressed in deficiency letters.

B We are on record requesting that the public comment period on this application be held open for 60 days if the State eventually deems the application complete under the requirements of Montana Law. Since the State has not yet responded to our request in this matter we must reassert that we believe it to be a clear mandate under the Surface Mine Control and Reclamation Act. Public involvement in strip mining decisions is an integral and preeminent mandate of the federal statute. The opportunity to comment on the complete application is basic and essential to this principle. We urge the State to remedy this situation and modify its regulatory program accordingly.

Federal Lands

C At this time, we must alert the State to a serious problem with the processing of the Montco Mine application. After close examination of the proposed mine plan, land ownership, and the federal strip mine law, we believe that a federal permit for this mine is required. Section 701(4) of the federal act defines "Federal lands" as "any land, including mineral interests, owned by the United States without regard to how the United States acquired ownership of the land...." (Emphasis added.) Section 523 of the Act requires implementation of a Federal lands program applicable to all surface coal mining and reclamation operations on any federal lands. Permit requirements for such operations on federal lands are set out at 30 CFR 741. In particular, 30 CFR 741.4(b) provides that, in states such as Montana, where there is an approved cooperative agreement, the State regulatory authority and Office of Surface Mining (OSM) have joint responsiblity on all actions regarding applications on federal lands. See also CFR 926.30 (Article V).

We realize that the State received a letter from John Hardaway of OSM on February 4, 1981, stating that a federal permit was not required for the Montco Mine. It is our view, however, that this determination is inconsistent with federal law, and would not withstand a challenge.

No Need For The Coal

D We recognize that the Montana strip mine law does not require a consideration of need or demand for the coal in deciding whether to permit a mine. Nevertheless, it is important to note that the denial of the permit or the rejection of the application will have no adverse consequences on either the national or regional supply of coal. The market for Montco's coal is the steam electric industry - primarily in the Mid-west and the Pacific Northwest. That market is a dismal one from the standpoint of coal producers and all

B The public objection period was held open for 60 days after Montco's public notice of application. Public comment has been received throughout the application review process.

C The Office of Surface Mining will not issue a permit, but will issue a statement of concurrence or nonconcurrence with the state's decision after analyzing the environmental consequences in a separate EIS.

D Comment noted.

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indications are that it is likely to remain so. Projections of a bullish coal market during the early 1970's, when this mine was conceived, have evaporated as conservation and alternative energy supplies have become a reality.

E To illustrate the point:

* The Mid-Continent Area Power Pool (MAPP), made up of 27 utility participants and 14 associate utility participants in the Midwestern market area for the Montco Mine coal, projects a 7,130 megawatt excess capacity for the summer of 1982, its annual peak demand. This amounts to a 35% reserve margin for the region. In the power business a 15% reserve margin is considered desirable - 35% is incredible.

* The Bonneville Power Administration consultant, Energy Ventures Analysis, has recently projected a much lower growth rate of electrical consumption for the Northwest than previously estimated. Electrical demand is expected to remain flat for the 1980's and have an annual growth rate of 1.2 percent through the early 1990's, according to the Energy Ventures forecast. It also reports that "rapidly escalating prices" will result in major conservation by energy users.

* Coalcast Quarterly reported in May that utility coal demand will be much less than current industry forecasts indicate. Only a few large coal contracts for new power plants will be signed in the next five years, and many of the coal-fired power plants that utilities are projecting will be built will be delayed or cancelled, according to the Coalcast report. (COAL WEEK, May 24, 1982.)

* The Office of Technology Assessment in December, 1981, reported that the Powder River Basin had excess production capacity of 75 million tons in 1980, a 73% over-capacity.

* In July, 1981, analysts at Drexel Burnham Lambert predicted western coal production capacity would exceed demand by up to 34% if electricity demand were held to a 3% increase in coming years. (COAL WEEK, July 13, 1981.) Actual increases in recent years have fallen below 2%.

Tongue River Unsuitability Petition

F In December, 1981, the Commissioner of State Lands denied a citizens' petition to designate the area where the proposed Montco Mine lies unsuitable for strip mining. In the statement of reasons for rejecting the petition, the Department repeatedly cites the mine plan review and permitting process as the

E **Your comments are noted.**

F **Note that chapter III, Geology (Overburden), Soils, and parts of Vegetation have been rewritten to reflect changes in Montco's revised permit application.**

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appropriate stage to address the questions raised in the petition. To quote:

> "Thus, while it is possible that reclamation may not be possible in specific areas or that special handling may be required in specific areas, this can only be ascertained by intensive characterization of soils and overburden, and by knowing the methods of handling, all of which is included in mining and reclamation plans.
>
> ...
>
> Thus, any determination of nonreclaimability for a specific area cannot be made until more area-specific data and a mining and reclamation plan is submitted.

We believe the petition decision represents a formal, public commitment on the State's part to seriously address the issues of unsuitable materials, shortage of soils, and reclamation potential when reviewing proposed mine plans within the petition area. The DEIS, however, does not indicate that these issues have been addressed in the context of the petition review. Moreover, the document reflects a vague and "iffy" disposition towards the problems. For example, "if" Montco crushes the scoria maybe significant soil loss won't occur; "if" someone tests the overburden and soils during the mining operations maybe unsuitable materials will not appear in the top-soil or root-zone; "if" Montco has more than one overburden pile, maybe it can adequately handle unsuitable materials. This tells the public nothing about whether these steps will actually be followed or whether they will indeed result in reclamation success.

GEOLOGY

The proposed Montco Mine area presents a number of geological and physiochemical obstacles to successful reclamation. The permit application and mine plan do not affirmatively demonstrate reclamation will be successful in the face of these obstacles.

G The mine area is permeated with dangerous levels of salts, sodium, and clays in the soils and overburden. Additionally, nickel, boron, and molybdenum, all toxic trace elements, are present in high concentrations. (DEIS, pp. III-6,7.) There is an unacceptable lack of core drilling information in all of the mining units, to determine that reclamation can be achieved at this mine.

According to the DEIS, the core drilling in the North King Mining Unit (NKMU) represents only a 60-70% confidence level in the location of unsuitable and toxic materials slightly better than tossing a coin. The extremely high levels of sodium that pervade the samples (SAR averages 35.5 in 50% of the core lengths), as well as saline zones and clays

G Montco has changed its overburden handling plans, thus eliminating separation by color and lithology in the field. Color and lithology were, however, among the various parameters used to construct the isopach maps. The reliability of the overburden core data has been analyzed in more depth. The new handling plans greatly decrease the chances of placing unfavorable overburden in the rootzone. The statistical analysis of reliability shows that the chance of error from the overburden data is less than given in the draft EIS. See chapter III, Geology, Overburden, and appendix 8 of the final EIS.

Outside the North King Unit, we agree that additional drilling would be necessary to adequately delinate zones of unfavorable overburden. For example, boron may be a problem in the North O'Dell unit and molybdenum may be a problem in the South Gate unit. (See chapter III, Geology, Overburden.) Not until more drilling is performed would the extent of the problems be revealed. We also agree that reference to the cost of drilling is inappropriate, and this has been deleted.

Based on an extensive literature review by the Department's technical staff, nickel would not be considered a problem in an alkaline environment such as at the Montco minesite. (See chapter II, table II-4.)

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necessitate increased drilling. The Department indicates that drilling to achieve a 90% confidence level in the location of sodium and any other toxic or unsuitable materials is "cost-prohibitive". Such an attitude is utterly invalid on the Department's part. No where in the law does it state that the agency must subvert reclamation to economic feasibility. In fact, NPRC petitioned the Department to declare this area unsuitable for mining because of the economic infeasibility of reclamation. In denying the petition, the Department explicitly deferred the question to the permit review process, saying that it required more data than was available for the petition review.

In the remainder of the mining units, particularly South King and North O'Dell, core drilling data is even more inadequate. Samples described in the DEIS show very serious problems. Based on the data available on these subsequent mining units it is not at all clear that the applicant can carry out the requirements of reclamation consistent with the purposes of the strip mine act (Sec. 82-4-224(1)).

H The Department or the applicant should prepare maps showing the vertical distribution of the unsuitable materials and make them available to the public for comment in a supplemental DEIS. The location of these materials is very important, especially if there is to be selective placement of overburden. The tables should also indicate the texture and/or percent clay, the percent coarse fragments, the electric conductivity, the sodium adsorption ratio, and the saturation percentage.

I The extremely high levels of sodium in the North King Mining Unit and in subsequent mining units will restrict permeability and pose a threat to long-term post-mining landscape stability. Research in North Dakota indicates that highly sodic spoils materials can result in piping, even several years after regrading and top-soiling has occurred. (Groenewold.)

J Does the Department believe tests for selenium using a water-base extract are valid? Selenium is a very serious problem where present because of its toxicity for animals. The geology of the area would indicate that selenium may be present. Valid tests should be conducted employing an acid or base extract to better assess the presence of selenium.

K High levels of boron are present in about 25% of the soil and overburden sampling sites. At the Montco site, data shows frequent high boron content (over 1.0 ppm) within 18 inches of the surface in most cases. High boron levels were found from the surface and as deep as 75 feet. A comparison of high boron samplings with soil types showed a wide range of soil types and textures are involved, from gravelly sandy loams to clay indicating problems with color and lithology tests for unsuitable materials. Will this be addressed by the applicant?

H Maps of this type have been prepared and have been available to the public since the original permit application was submitted in late 1980. These maps are based on most of the parameters you list in your comment. Please refer to appendix N of the application, maps N-4 and N-5, and figures N-2 through N-13. Copies of the application are available for public review at the Department's offices in Helena and Billings, and the Rosebud County Courthouse in Forsyth. Please also see table III-1, in chapter III, Geology, Overburden.

I According to studies at the West Decker mine (Dollhopf et al., 1980), rootzone spoil that is medium-textured and moderately affected by sodium would maintain good hydraulic conductivity as long as the clay mineralogy is not dominated by smectite. North King mining unit overburden appears to have little smectite present based on the saturation percentage data.

Most piping requires cracks at the surface of the soils to begin the process. Such cracks are not expected to occur. In any case, the North Dakota research was performed on extremely sodic spoil containing smectite. Based on Montco's revised overburden handling plans and the differences in the spoil material between the North Dakota mines and the North King site, very little sodic material is expected to be found in the postmining rootzone.

J Yes, the Department believes that the test for selenium using the hot-water-soluble extract is valid. Selenium is a complex element and, to date, little research has been performed on its behavior in a disturbed system. The Department's current proposed suspect level (see chapter II, table II-4) of 0.1 part per million (ppm) is based upon the work of Olson et al. (1942) in South Dakota and more recently of Soltanpour and Workman (1980) on North Dakota soils and Colorado mine spoil. The first paper seems to support the suspect level of 0.1 ppm for hot-water-soluble selenium based on studies of western wheatgrass and a conservative estimate of 5.0 ppm in vegetation as being suspect in livestock forage (Lakin, 1972). The second paper also supports this level (0.1 ppm) based on greenhouse studies with alfalfa. This study, however, used ammonium bicarbonate-DTPA as the extract, but high linear correlations were found between both extracts. The Department would consider the use of the ammonium bicarbonate-DTPA extract in the place of hot water if such an extract was requested.

The Department does not understand your reference to an acid or base extract. If you are referring to an extraction such as by a strong acid (e.g. nitric), the results would highly overestimate the plant-available amount present. If you are referring to a basic extraction such as alkali fusion, the plant-available amount present would also be highly overestimated. Neither test would be valid.

K Based on a recent review of the literature, the Department now considers 5.0 ppm as the suspect level for boron in soils and overburden (Sutton et al., 1981; Gusta, 1980; Gough et al., 1979; Eaton, 1944). The former (1977) suspect level for boron was 8.0 ppm, much higher than the 1.0 ppm figure you mention. In any event, based on the soil and core data available, boron problems are indicated only in North O'Dell unit overburden, where only two cores have been analyzed. Montco would have to further delineate the extent of the elevated boron and, should high levels of boron become a potential problem, propose mitigating measures in a subsequent permit application for this unit.

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L There is no chemical amendment that can be added to render the boron nontoxic. Reclamation can be achieved by using large quantities of leaching water. (Sandoval, 1981.) Without water for irrigation and with limited rainfall conditions found in the Montco Mine area, leaching to remove excess boron may be impractical. Has the Department analyzed the suitability of the soils in the mine area for irrigation? In the Tongue River Final Petition Evaluation Document (p. 218), the Department has acknowledged that "very little research has been done or published regarding the tolerances or requirements of native range grasses, fords, shrubs, and trees relative to boron". The proposed mine plan does not provide sufficient precautions to prevent high levels of boron in the soils.

M The mine plan in the NKMU calls for disturbing large quantities of clinker (or scoria). This has important ramifications on hydrology and soils which will be discussed further below. Scoria, unless it is specially treated or crushed, will be broken into coarse and fragmented pieces and utilized heavily for a root zone material. Will the Department require Montco to crush the scoria? Among the problems that the scoria will cause are soil loss and water stress for plants. Its utility as a rooting medium could be very poor if it does not break down into fines.

N Has the Department or Montco analyzed the physical properties of the clinker with respect to its hydrologic behavior in this situation? Soil scientists have found that abrupt change in texture can cause a hydraulic barrier and result in problems in the hydraulic performance of a soil profile (Hillel, 1981, p. 143).

O Has the Department investigated the use of scoria as a root zone material? Its use as a root zone material in the proposed mine plan appears to be unprecedented in this region. The DEIS alludes to the potential problems of water stress and soil loss. It fails to address the physical properties of the scoria in the NKMU relative to its viability as a rooting medium. Does the Department plan to address this question? The applicant has presented no plan to crush the scoria, which was discussed as a mitigation measure in the DEIS. Tests should be conducted on the properties of both fragmented and crushed scoria. It is not appropriate, however, to issue a mining permit based on an experimental practice.

P The proposed mine plan shows only one overburden stock-
pile for the NKMU (DEIS, p. III-10). This is in effect violates
Montana law at 82-4-231, which requires that all toxic and
unsuitable materials should be buried. These materials cannot
be separately handled, and consequently buried if only one
Q overburden stockpile is planned. An added problem is the
applicant's inadequate methodology for identifying unsuitable
and toxic materials. In effect, it will allow the mixing
of these materials in "so-called" suitable soil and root zone
profiles.

L The Department does not consider boron a significant problem in the soils. Of the hundreds of soil samples analyzed and presented in volume 15, appendix E, supplement E3 of the application, only seven are above the current suspect level of 5.0 ppm and only four are above the former (1977) suspect level of 8.0 ppm. A significant portion of the samples fell below the boron analytical detection limit of 0.1 ppm. See also answer K.

M Please see the discussion on burn material in chapter III, Geology, Overburden. It is unknown at this time whether the Department would require Montco to crush the scoria. This would depend on such things as the effectiveness of crushing as a mitigating measure, and the availability of other materials as a rooting medium.

N We agree that abrupt textural changes can cause a hydraulic barrier in soils. However, after measuring water content with depth in over 300 mine soils in Montana, Wyoming, and North Dakota, Dollhopf (Montana State University, oral commun., February 14, 1984) has never observed this phenomenon. He feels that this does occur in disturbed systems, but not very frequently, and very rarely in low precipitation zones such as southeastern Montana. (Note that Hillel (1981, p. 143) only discusses two aspects of the hydraulic barrier phenomenon, not "problems in the hydraulic performance of a soil profile.")

A hydraulic barrier could actually have favorable results in semiarid areas because it could act to produce a perched water table or argillic horizon and hold moisture near the surface for plant growth. This has actually been recommended for ponderosa pine by University of Montana researchers.

O Please see the discussion on burn material in chapter III, Geology, Overburden.

P All unsuitable materials would be buried as required by law. Please see the discussion regarding the overburden stockpile in chapter III, Geology, Overburden.

Q Due to changes in Montco's permit application, the text has been changed. Please see chapter III, Geology, Overburden; and Soils.

R	Mixing will also occur because of uncertainties in the correlation between lithology-color and overburden properties; because Montco has failed to gather the core data necessary to identify and locate overburden properties; and because Montco has no plans to separate unsuitable materials from suitable materials. Reliance on lithology and color to identify unsuitable materials appears dubious. Has the Department considered the effects of moisture on the color of disturbed overburden?	Due to changes in the permit application, the text has been changed. Please see chapter III, Geology, Overburden.
S	Will the Department require that Montco revise its materials handling plans to insure that mixing does not take place? At a minimum, three distinct types of spoil, in addition to topsoil should be selectively handled and placed: unsuitable overburden due to sodium, salt, clay or toxic trace elements; scoria and fragmented materials; and a third category of suitable material which is neither too coarse nor too sodic (or otherwise unsuitable).	See R.
T	What is the sodium content of the NKMU coal? It should be shown in Table II-1, p. II-6. This is an important factor in describing the viability of the coal in the marketplace. High sodium coal cakes in boilers causing operational problems. High sodium coal would be a significant disadvantage in the marketplace.	The sodium content of Montco's North King unit coal is reported in Table I-1 of the Final Tongue River Petition Evaluation Document to be 3.23 percent. This compares with a range of 0.31 to 7.84 percent sodium at other Montana surface coal mines (DSL and OSM, 1982, p. I-6).
	SOILS	
	The DEIS has identified some major problems in the area of soils at the Montco Mine. The "Summary of Impacts," (p. III-20) raises again the question of whether the site can be reclaimed. The combination of the soils problems and the problems with clinker, just as an example, appears devastating. Clinker is a droughty material. Loss of profile, structure, organic matter, pore space and continuity in the post-mining soil will reduce infiltration and waterholding capacity. This doubly jeopardizes the long-term viability of reclamation.	
U	The Department appears to tacitly accept reclamation plans that would allow the mixing of unsuitable materials in the soil profile. Such acceptance conflicts with the overriding statutory responsibility to insure that reclamation shall be affirmatively demonstrated.	The Department has not accepted Montco's reclamation plans. Note that many of the shortcomings of Montco's original plan are described in the draft EIS.
V	The document has virtually ignored the presence of boron in the mine-site soils. This is an issue not only with respect to the viability of the soil as a plant medium. Is it also a potential problem with respect to the potential for surface water degradation? Montco's plans do not address the problem of boron. (See earlier comments on Geology.)	Please refer to answer K. Also, boron is not sufficiently concentrated in the Montco area to degrade surface water.
W	The DEIS acknowledges the direct link between soil depth and vegetation production in the "soils" section (p. III-22) and in the "Vegetation" section (p. III-28). The quantity of suitable soil materials, or lack thereof, constitutes one of the major roadblocks to reclamation at the proposed	The chapter III Soils and Geology, Overburden sections have been rewritten. Please refer to these sections.

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	mine. The problem is exacerbated by the acknowledged likelihood that soil is expected to be lost through cracks in the root-zone material (clinker) and through erosion (pp. III-22 and 23). Does the Department believe that adequate soil is present to compensate for these losses? What margin for error does the Montco plan provide?	
X	Has the Department or Montco analyzed the probable bulk density of reclaimed soils and root zone materials? This can affect infiltration and permeability. Bulk density can be a problem where clays are present. Certain chemical characteristics will also exacerbate problems with bulk density.	The Department has not attempted to quantitatively predict postmining rootzone bulk densities. Nor has Montco discussed bulk densities of postmining surface materials, except as it relates to mechanical techniques proposed to loosen up compacted materials during final reclamation stages. In addition to the soil characteristics mentioned in the comment as influencing bulk density, the equipment and techniques used and the weather and soil moisture conditions during final grading, surface spoil scarification, and soil redistribution and tillage are also important.
	VEGETATION	
Y	The "Summary of Impacts" (p. III-27) indicates that partial revegetation failure appears likely. Yet the State inexplicably anticipates a climax vegetation production level of 85-90 percent. Does this conclusion take into account the fact that post-mining soils will be mixed with other soil horizons, and additional significant problems exist with soil quantity, unsuitable materials in the soils, and root-zone materials?	Owing to changes in Montco's application, the Vegetation section has been revised. Some of the problems you mention are no longer anticipated: Topsoil would not be mixed with subsoil; soil quantity is expected to be adequate (see Soils); unfavorable soil materials would no longer be salvaged along with the favorable (see Soils); and enough favorable overburden is available for an 8-foot rootzone (no moderately favorable material would be used; see Overburden). Regarding stocking rates and production levels, see letter 24, answer A.
Z	The DEIS reference to grazing at Western Energy's Rosebud Mine (p. III-30) is inappropriately used to justify expectations of productivity at the Montco site. It is also taken out of context. Western Energy's experiments had nothing whatsoever to do with range holding capacity. Western Energy was attempting to alter the plant community composition of a plot by "flash grazing," with extremely high stocking rates for a short (month-long) period. This was done to promote the competitive advantage of native species by over-grazing introduced cool season grasses and by interseeding prior to the release of the livestock to promote the trampling of native seeds into the ground. Reference to the Western Energy study should be deleted and any conclusions based on it (e.g. "the reclaimed land would be better than its current condition" p. III-30) should also be taken out.	We agree. See letter 24, answer D.
AA	The means to reestablish ponderosa pine on reclaimed land have not yet been refined. In fact, there is not one shred of evidence that ponderosa pine can be established on revegetated land. Research is being conducted in this area. The DEIS fails to acknowledge the fact that the reclaimability of pine stands has not been established. It is highly irresponsible to approve reclamation plans that rely on significant stands of ponderosa pine. Moreover, if the pine play an important ecological role with respect to wildlife and/or livestock, mining should be prohibited in those areas until research has demonstrated that ponderosa pine can be reestablished.	Although long-term evaluations of ponderosa pine reestablishment are not yet complete, evidence of potential success is available. Ponderosa pine can be established from seedlings (Stewart and Beebe, 1974; Owston and Seidel 1978; Jensen and Hodder, 1979). Orr (1977) reported a 1-year survival rate of 51 percent for containerized seedlings. Containerized seedlings planted on reclaimed land near Hardin, Montana, exhibit a 59 percent 4-year survival rate (M. Mitchell, Westmoreland Resources, pers. commun., September 14, 1983). Reclamation scientists indicate that, although long-term mortality may be roughly 50 percent, pine stands can probably be reestablished (N. Stark, University of Montana, pers. commun., January 25, 1984; I.B. Jensen, Western Reclamation, pers. commun., January 24, 1984). Montco proposes to restock pine stands to compensate for mortality. A discussion of ponderosa pine reestablishment has been added to the text. (See Vegetation.) Coniferous cover/wildlife relationships are discussed in the Wildlife sections. Your other comments have been noted.
BB	The DEIS should include the climax forage production levels and the post-mining forage production levels.	Production of range sites near climax (U.S. Soil Conservation Service, 1981) was combined with range site acreages (Montco, 1983, Vol. 16, supplement F-6) to estimate potential forage production of the North King mining unit. Total annual production would range from about 834 lbs/acre in unfavorable years to about 1,610 lbs/acre in favorable years. Median production would be about 1,256 lbs/acre. Production of grasses would range from about 651 lbs/acre to about 1,262 lbs/acre, with a median of approximately 980 lbs/acre. Postmining forage production level is unknown. It would correspond to the grazing potential discussed under "Range condition and stocking rates" (Vegetation III, Section 2.)

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CC Buffalo grass (Burhloe dactyloides) is an indicator of low condition ranges, is a low producer and would reduce the overall quality of the seeding mixture. Why is it being used?

DD Whitmar, a bluebunch wheat grass cultivar, has a low drought tolerance and should be avoided. Why it is being used?

HYDROLOGY

The DEIS points out that the proposed mine lies between a major recharge area (to the south and southeast) and the Tongue River drainage (to the North and Northwest).

Generally, the DEIS analysis of hydrology is superficial, myopic, and at points nonexistent. SUMRA and MEPA regulations mandate far more analyses of the consequences of issuing a permit. Moreover, the law and regulations impose great responsiblity on the Department to protect the ground and surface water systems, both on and off the mine site. This is particularly critical in view of the irreversibility of the processes set in motion once mining has commenced, particularly with repsect to groundwater. The Committee on Groundwater Resources in Relation to Coal Mining (National Research Council, 1981) points out:

> Recognition of the time scale is important, because groundwater monitoring will not, in some areas, provide an adequate indication of the effects of mining until long after the areas have been mined and backfilled and reclamation is complete. Thus, real-time monitoring cannot be relied on to signal impending changes soon enough to allow appropriate adjustments in mining procedures and reclamation measures. Consequently, evaluation of effects of mining on groundwater quality must rely more on prediction than on real-time monitoring.
>
> ...
>
> Anticipating and avoiding the creation of problems in the first place may be easier, cheaper, and more effective than any remedial action. (p. 6, P. 11)

Surface Water

EE Without a surface water drainage control plan for the mine it is impossible to comment on its adequacy. This plan should be thoroughly discussed in a supplement to the draft EIS if and when the application is deemed complete. It is of concern because of the steep slopes which Montco proposes in its post-mining landscape and the probability of revegetation failures. These factors could result in significant degradation of surface water systems on and off the mine site. What will be the off-site impacts of surface water drainage from the mine site?

CC Buffalo grass would be a beneficial addition to the seed mixture. It establishes well, develops rapidly, and provides a reliable vegetation cover (De Puit et al.; 1978; Jensen and Sindelar, 1979). Although production is low, buffalo grass is palatable and nutritious for cattle (Yaeger et al., 1976).

DD Bluebunch wheatgrass (Agropyron spicatum) is common in the proposed permit area. There is little commercial production of bluebunch wheatgrass seed. Therefore, seed mixtures would include the more available beardless wheatgrass (Agropyron inerme). (See revised appendix 1). Reclamation and range scientists consider beardless wheatgrass to be an ecological equivalent of bluebunch wheatgrass. Both are native grasses and have essentially the same growth habits, nutrient and soil requirements, grazing responses, and forage values. Thornburg (1982) classifies beardless wheatgrass as drought tolerant.

EE Montco submitted a drainage-control plan with its original application. The Department has determined that it is not adequate. The Department will not issue a permit to Montco until the surface water drainage control plan is determined to be satisfactory. The Department does not consider the submission of a suitable drainage control plan as an obstacle to the EIS process, but rather as a matter of appropriate engineering design. See testimony 3, answer A.

Because a permit cannot and will not be granted until an appropriate plan has been submitted, off-site surface water degradation due to the lack of an acceptable drainage would not occur. The reason for requiring effective drainage control plans is to prevent off-site discharges and sedimentation, whether they result from normal precipitation and runoff or from reclamation problems.

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The "Dissolved Solids Loads in Tongue River" and the "Cumulative Hydrologic Impacts" (pp. III-15-17) rely entirely on analyses done for the Tongue River Unsuitablity Petition. That analysis, which was conducted under a statutorily imposed deadline of twelve months, should be further refined if it is to be used in this instance. The following modifications should be made to more accurately reflect the potential for salinity hazards to agriculture:

FF 1. Effects on the concentration of dissolved solids by evaporation in the Tongue River reservoir should be factored into the analysis. This should incorporate the increased leachate of dissolved solids to be anticipated from both existing and proposed mines above the Tongue River Dam.

FF Because analyses and predictions of stream flow quantity and quality used in the Woods model (1981) used values as released from the reservoir, the effect of evaporation from the reservoir surface was included in the model.

GG 2. The minimum instream flow of the Tongue River, as set down in the Yellowstone Water Reservations at 75 c.f.s., does not reflect the historic low flows likely to occur in the river. To determine salinity hazards in the middle and lower reaches of the basin it is necessary to employ the historic low flow regimes that have occurred and will recur in the river.

GG New computer simulations of possible development scenarios within the lower Tongue River valley were made for the final EIS (tables III-2 and III-3). Included in the scenarios were historical low-flow conditions. Please see letter 9, answers B and C.

HH 3. The water quality model should be validated. TDS and boron concentrations were modeled to predict effects of a reservoir and strip mine on the Poplar River in Northeast Montana. According to the International Joint Commission (IJC), which oversees water quality on the Poplar, the model underestimated concentrations during low flows by 20, 30 or even 50 percent compared to measured concentrations. (IJC, 1981)

HH The Woods computer model underwent customary review within the U.S. Geological Survey. It has been validated (Woods, 1981, p. 25).

II 4. The higher Tongue Dam remains a hypothesis at this time. If the dam is raised and holding capacity increased, it will not mutliply the flow of the river by a factor of 2.5, one-hundred percent of the time, as was modeled in the case of the petition. There have even been rumors that the planned new reservoir may not be as large as was premised in the petition model. Has the Department corrected this flow in its model?

II The new computer simulations prepared for the final EIS assume the Tongue River Dam and Reservoir would remain as they are today. Please see revised text and letter 9, answer D.

JJ 5. The scenario upon which the decision rested was one that included increased irrigation, but no mining in the petition area (p. III-17). The Montco Mine, and concommitant mines that would accompany it because of the railroad, must be factored into the determination of cumulative hydrologic impacts of all mining in the area. What happens to the scenario when the Montco Mine and several others open in the area?

JJ The Montco Mine and "all anticipated mining" were investigated in a scenario in the final EIS. Please see the revised text and letter 9, answer F.

KK 6. The petition analysis "because of the time limitations imposed by the petition process, (did) not consider local variations in the soil type, which may be important in relation to potential irrigation hazards." (FPED p. II-9.) Will the Department or the applicant address the issue of salty water

KK Based on computer simulations and analyses prepared for the final EIS, there is no evidence to support a contention that mining impacts will produce salty irrigation water in the Tongue River, although there is ample evidence to suggest that increased flood irrigation will significantly degrade river water quality.

on salty soils? Neither the State nor Montco has attempted such an analysis which is essential to determine the potential hazard to agricultural productivity.

Groundwater

LL Neither the application nor the DEIS addresses the post-mining restoration of recharge areas. In its description of groundwater hydrology, Montco notes that the clinker deposits are important recharge areas (MPA, Bb-16). Restoration of these areas after mining, however, appears to have been neglected. In response to a question in the April 2, 1981 deficiency letter, Montco provided some additional information on some characteristics of the clinker deposits. No attempt was made, however, to provide for their restoration or assess their importance.

The clinker deposits in the mine plan area (NKMU) are substantial. The DEIS (p. II-19) alludes to the hydroleologic importance of clinker as a source to the shallow aquifers in the area. Yet the mine plan calls for the burial of clinker in the root-zone. The loss of the exposed clinker due to mining disturbance and the consequent ramifications on the recharge capacity (82-4-231(3)(k)(iv)) has not been addressed.

MM Neither the application nor the DEIS contains a detailed description of the probable hydologic consequences of the proposed operation on the mine plan and adjacent areas with respect to the hydrologic regime, and the quantity and quality of water in the surface and groundwater systems under all seasonal conditions (see MAC 26.4.314(d)). When and where will this be addressed?

NN The DEIS (p. III-19) does indicate some very high post-mining salinity levels, but dismisses them as being "generally within the premining range for coal and interburden groundwater units in Montco's mine plan area." This is misleading. The DEIS only refers to the range of existing groundwater quality. It predicts electric conductivity of about 4,500 micromhos per centimeter in post-mining groundwater in the North King unit. Out of 28 Montco Mine groundwater samples (DPED, App. B) only six show conductivity above 4,500 - only two are above 5,000. Thus, while existing quality ranges from 1,565 to 7,895 micromhos per centimeter, half of the samples of existing water quality are below 3,000. Post-mining groundwater quality will be significantly degraded.

OO The DEIS claims that "alternative groundwater sources are available." (p. III-20) It provides no discussion on the quality of those sources. Neither does it address the viability of operating wells where springs once were, nor of operating and maintaining substantially deeper wells. Elsewhere in the DEIS (p. II-20) the statement is made that "measurable groundwater occurrence in the entire Montco Mine

LL Clinker is a significant recharge source only in small areas. This stems from the varying thicknesses and lateral extent of clinker deposits, from the proximity of the clinker areas to their discharge point, and from the small areal extent of the clinker compared to the regional recharge area. Such circumstances suggest that clinker in the North King unit contributes little recharge to the area's ground water system. The Draft Tongue River Petition Evaluation Document (DSL and OSM, 1981, p. IV-3) states that in "...very permeable areas important to recharge (clinker and coarse soils), it is likely that reclamation efforts will not be able to restore pre-mining infiltration rates." The document goes on to state, however, that clinker areas that may be disturbed by mining comprise a small portion of the total recharge areas. Thus, mining would not significantly affect regional recharge through this portion of clinker.

MM The draft EIS did describe the probable hydrologic consequences. The final EIS contains additional information. A description of probable hydrologic consequences is also contained in volume 5, chapter V, section 2.3 of the Montco Mine permit application.

NN Your comment is noted. Postmining ground water quality estimates contained in the EIS are based on conservative assumptions that probably yield results representing the worst of circumstances. Even under such circumstances, estimated postmining ground water electrical conductivity of 4,500 umhos/cm would not change the suitability of the water for today's uses. Acceptable alternative sources have been identified.

OO Montco has identified the most accessible aquifers below the coals as alternative ground water supplies (vol. 1-A, chap. 11-A, Montco permit application). These aquifers include sandstones in the Tullock Member of the Fort Union Formation and the Hell Creek Formation. Wells in the Tullock-Hell Creek sandstones reliably yield 20 gpm in the area. Industrial wells have yielded as much as 200 gpm from the sandstones below the coals in the Montco area. Hopkins (1973) states that the Hell Creek aquifer is known to be a

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plan area appears to be largely restricted to the coal seams and valley alluvium." The most important groundwater bearing units in the NKMU are the Middle Knobloch and McKelvey coal seams, which are to be mined. Thus, 80-100 feet aquifers would be supposedly replaced by much deeper aquifers ranging from 1,300-4,000 feet. Has the Department analyzed the viability of these deeper aquifers?

PP Does the Department intend to require Montco to reconstruct or buffer from unsuitable materials the aquifers it will destroy? Upon completion of the mine plan application, the State should address this issue in a supplement to the DEIS. Determinations must be made regarding the availability of suitable materials to adequately buffer the presumed post-mining aquifer zone, as well as provide an eight-foot burial zone for roots. The tendency towards high clay content in the overburden is of particular concern in this respect.

QQ Some important questions surround Montco's water supply of approximately 260 g.p.m. The fact that the source has not yet been identified makes it impossible to address at this time and is yet another example of the need for a supplement to the DEIS upon completion of the proposed mining plan. What will be the location and effect of this water withdrawal on the hydrologic balance?

RR More work must be done to describe the groundwater system. Aquifer test and gradient data should be cited to substantiate the estimate of 4 gallons-per-minute flow through the NKMU coal aquifers. Additionally, an analysis of sandstone aquifers in the area should be done. Sandstone aquifers of importance have been identified in the Knoblock overburden along west Otter Creek, nearby. The sub-alluvium bedrock along King Creek has not been adequately described and analyzed for its hydrological significance. The second deficiency letter indicates that more wells are needed to define this aspect of the groundwater regime of the NKMU.

Alluvial Valley Floor

SS The permit application and the DEIS are utterly deficient in their analyses and review of the effects of mining along an 11.5 mile stretch of bench above the Tongue River alluvial valley floor. By all accounts, this bench intercepts a major flow of groundwater into the Tongue River system (p. II-19). It is a significant portion of the only reach of the river which gains flow between the headwaters in the Big Horn Mountains and the mouth of the Tongue at its confluence with the Yellowstone. We believe that the law (at 82-4-227(3)) and the Montana Environmental Policy Act and rules (26.2.625) clearly require that this issue be addressed for the life of the mine. Failure to affirmatively demonstrate that mining will not materially damage the quantity and quality of water in surface-water or groundwater systems that supply the alluvial valley floor is grounds for permit denial. Will this be addressed?

reliable and excellent source of ground water in the Tongue River valley. Although variable, the water of the Tullock-Hell Creek aquifer system has dissolved solids concentrations of about 1,000 mg/l. Thus, the deeper wells will yield better quality water for both stock and domestic use than the shallower coal aquifers will yield. Several private wells have been completed in the Tullock-Hell Creek aquifer in the Montco area.

Additional analysis indicate that sandstone units over and under the Knobloch coal seam may be aquifers in the North King area. Please see revised text.

PP Please see testimony 8, answer G.

QQ See revised text, chapter III, Hydrology.

RR The estimate of 4 gallons-per-minute flow through the North King mining unit coal aquifers is based on hydrogeologic data contained in volume 11, appendix Bb of the Montco Mine permit application. An analysis of possible sandstone aquifers in the area has also been completed. (See revised text.) Additional observation wells have been completed in the King Creek alluvium by Montco in response to the second deficiency letter. The data generated by the additional well installations are included in the Montco permit application (vol. 11), and analyses of these additional data have been made in the preparation of this final EIS.

SS The reach of the Tongue River adjacent to the Montco permit area is not the only gaining portion of the river from the Big Horn Mountains to the river's mouth. Woessner et al. (1980) identified at least three reaches along the Tongue River within Montana where ground water discharges to the river. The lands beside the Montco permit area exhibited the most significant ground water discharge to the river in Montana.

Analyses by DSL and OSM (1981), however, indicate that ground water flow rates into the Tongue River would continue to be the same after mining as before. Van Voast (1978) concurs with this analysis in an evaluation of pre- versus postmining ground water inflow rates to the Tongue River from existing mines. Montco, in its permit application (vol. 5, chap. V, section 2), calculated the change in ground water inflow to the Tongue River in response to mining in the permit area. The company's analysis indicates insignificant impacts to the rate of ground water inflow to the Tongue River alluvial system.

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The DEIS does not address the quality and quantity of water in the alluvial valley floor of the Tongue River. An analysis must be commenced that includes all of the proposed mining units. Special attention should be given to the compilation of credible data on the flow rates of groundwater through the entire mine plan area as this is a major factor in the determination of spoils leachate in the alluvium.

O'Dell Creek

TT The DEIS at p. III-20 mentions that spoils water quality at O'Dell Creek will be "markedly worse" than elsewhere. It is negligent not to investigate this issue at the time of the initial mine permit application. Both laws and the rules (SUMRA and MEPA) extend clear authority to the Department at the outset of a mining operation to review the full range of hydrological impacts and issues. It is impractical, as experience has taught us, to open mines that are on a collision course with the law and expect the statute to be upheld. Neither is it fair to the applicant, the surrounding communities that would be absorbing impacts, nor the potential workers at the mine to lead them into believing that a mine may be opened when subsequent permits must be denied.

Montco has made no attempt in its plan for protection of hydrologic balance to address the impacts that will result from mining the entire mine plan area. This is in direct violation of Montana rule 26.4.314(c).

WILDLIFE

UU It seems that a fair amount of effort was made to document existing wildlife and wildlife habitat and the effect of mining on each. However, while the DEIS points out some critical losses, it neglected to mention any mitigating measures (except for the placing of nesting boxes for Kestral) in Chapter IV. Why weren't mitigating measures discussed?

VV The DEIS categorizes the impact of people in the Ashland area as a secondary impact. Many wildlife experts consider human population pressure on wildlife as a primary impact. The supplemental DEIS should scrutinize carefully the causal effect of having such a large population increase. In particular, more attention should be paid to the simple equation that more people means more hunting which often means more private land closed to hunting. A comparison of private land accessibility around Colstrip and Ashland might prove informative in this respect. Further, the loss of private access in the Ashland area will result in more pressure on the Custer National Forest. Has an analysis been done from a management standpoint that determines what the effect of this increased forest pressure will mean to the wildlife population and its effect on private and public land.

The quality of ground water inflow to the Tongue River alluvium has been estimated by Van Voast in the Draft Tongue River, Montana, Petition Evaluation Document (DSL and OSM, 1981). Woods (1981) demonstrated impacts to the Tongue River water quality under various scenarios, which included various levels of mining disturbance in the Tongue River valley. Ground water quantity and quality have been described in the Montco permit application (vol. 5, chap. V, section 2) for the Tongue River alluvium and for affected aquifers within the permit area. Van Voast (DSL and OSM, 1981) evaluated ground water quantity and quality data for the Tongue River alluvium in the vicinity of the Montco permit area. And last, additional computer simulations have been made to predict Tongue River water quality impacts attributable to Montco. Please see chapter III, Hydrology, for an expanded discussion of such impacts.

TT Your comment is noted. The spoil water quality at O'Dell Creek was estimated by two predictive techniques described by Systems Technology (1982) and Van Voast et al. (1978). Both techniques base their analysis on assumed worst case conditions and overburden saturated paste extract data collected from all proposed mining units. Predicted spoil water quality, based on these data, would be worse than today in the vicinity of O'Dell Creek.

The EIS does assess impacts that would result from the life-of-mine plan. (See chapter III, Hydrology.)

UU In addition to revegetation for wildlife, Montco has proposed several mitigating measures. They have been added to the text.

VV The term has been changed to "indirect," a more accurate description for impacts not directly caused by mining disturbances. Increases in recreational demands, such as hunting, are discussed on page III-80.

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WW In the list of impacts that would occur to specific species, the DEIS neglects to discuss the importance of the area just north of the mine site as a critical antelope winter range. (DEIS p. III-35) Was this area excluded from the wildlife study?

XX The DEIS notes (III-34) how much acreage would be temporarily lost due to mining and associated facilities. Why doesn't it include the wildlife habitat that would be lost due to housing and other population related development? This loss is crucial because this is land that will not be reclaimed after mining. Two of the three housing developments already in progress are 3-6 miles outside of Ashland in Ponderosa pine habitat used heavily by mule deer and other species.

YY The mining operation would shift the composition of habitat toward the sagebrush/grassland types. The DEIS notes that an immediate loss of habitat would result from a loss of vegetative cover. The loss of this vegetative cover would have long-term impacts on large mammals. It would also result in a population decrease for both these species and the bird species that depend on this habitat for food and cover. The loss of the Ponderosa pine habitat is of particular concern. Has there been any unqualified successful reclamation of Ponderosa pine in the semi-arid west? Has the State analyzed the critical nature of this habitat to the wildlife of the area as directed by 82-4-227(2)(a)? We submit that there are areas in the NKMU that should be selectively denied due to their critical and important role as wildlife habitat.

AIR QUALITY

ZZ The DEIS states that total suspended particulate (TSP) concentrations would increase significantly over pre-mining levels. It further notes that Federal primary standards and Montana ambiant air quality standards (MAAQS) would be exceeded outside the permit area. This would be caused by emissions from both the mining operation and traffic on FAS 566 (DEIS III-36). However, the DEIS then states that if the MAAQS were exceeded due to particulate emissions only from the permit area, an air quality permit would not be granted. Why is this the case? What would be the effect of both on- and off-site impacts on the Northern Cheyenne Class I increment?

The State should clarify whether the Federal primary or Federal secondary air quality standards would be exceeded outside the permit area (DEIS III-36 & III-38).

AAA Does the State Department of Health and Evnironmental Sciences Air Quality Bureau have authority over both on- and off-site new source impacts? It was noted at the June 3, 1982 hearing on the DEIS that if the gravel road was included

WW The pronghorn winter range is discussed on page II-34. Impacts on pronghorn in this area would be insignificant.

XX The acreage required for housing during the cumulative scenario is discussed on page III-75, paragraph 2. Roughly 240 acres would be required to meet housing demands caused by the Montco Mine alone. Most housing and other developments would probably be built on the edge of existing towns, rarely considered to be critical wildlife habitat.

YY Revegetation would replace most herbaceous cover within a few years after mining. Page III-35, paragraph 2, notes that reclaimed ponderosa pine/juniper habitat would cover the same acreage as the premining type. The revised text discusses the time required for conifer growth and Montco's proposal to approximate premining tree density. Current reclamation methods have not been used long enough to precisely predict reclamation results. Although some mortality of replanted conifers would occur, revegetated coniferous habitat probably would be similar to premining habitat.

ZZ The Air Quality Bureau cannot deny an air quality permit based on expected emissions from FAS 566. According to State of Montana Air Quality Rules 16.8.1102(1)(c) and (ii), a permit shall not be required for motor vehicles or any activity or equipment associated with the construction, maintenance, alteration, or use of roads.

As stated in the draft EIS, the TSP concentrations would increase slightly and would not consume the class I increment.

The text has been changed to distinguish between Federal secondary and Federal primary standards.

AAA The Air Quality Act does not require a permit for the use of roads (see answer ZZ). DHES has authority with the consent of the county to require watering or chemical treatment of off-site county roads to maintain ambient air quality standards.

in the SAI (1981) modeling, the Federal and State ambient air quality standards would probably be exceeded outside the permit area. Would this constitute grounds to deny an air quality permit?

COMMUNITY SERVICES

It is difficult to comment on the socio-economic analyses prepared for the DEIS. This is due in part to the neat and orderly presentation of numbers and percentages which tends to mask the fact that these are real people and very definite disruptive community impacts that are being discussed.

We are requesting that further analysis be done, to be included in a supplemental DEIS, utilizing a broader variety of assumptions and scenarios. Other assumptions that should be used are:

BBB That housing would not be available at Colstrip. This would create a significantly different scenario regarding residential distribution and the resulting impact on the communities of Ashland, Broadus, Birney CCC and Lame Deer. Also, why does the DEIS assume that the unionized Colstrip workforce will work at what could well be a non-union mine? Has Montco made any commitments to have an exclusively union workforce? If they don't, you're again facing a scenario quite different than the one projected in the DEIS.

It is clear that just a few changes in the assumptions utilized in the DEIS would have major implications for the conclusions that were reached in the socio-eoncomic analysis. The lack of infrastructure in the area to provide needed services necessitates that the supplemental DEIS more accurately address the probable impacts of the Monto Mine proposal.

DDD We are dismayed by the repeated attempts in this DEIS to downplay the increased incidences of child abuse, divorce and crime by suggesting that the increases may be nothing more than "improved record-keeping". We submit that the preponderence of studies and evidence indicate that these increased rates are much more than improved record-keeping and this purely conjectural language should be stricken.

EMPLOYMENT AND INCOME

EEE The DEIS states that the "residential distribution of the Montco workforce would determine, more than any other factor, socio-economic impacts". (DEIS p. III-40). It is further assumed that the largest percentage of the workforce will come from the existing Colstrip workforce and that they would continue to reside in Colstrip. Is the number of present

BBB You are correct that socioeconomic impacts are based on a set of assumptions. Housing assumptions rely on decisions about changes in housing stock and the source of construction and operations crews. You are also correct that as assumptions change so do impacts. A huge number of incremental changes could be made to each assumption. The analysis of all possible scenarios, however, is obviously unmanageable. Therefore, we have formed a most probable scenario, chosen as the set of circumstances least likely to deviate from what will probably happen. The description of socioeconomic impacts might be best considered an illustration of the types of things that would happen and not as a precise prediction of the future.

CCC The draft EIS makes no assumption about the possible union status of the Montco Mine. The relatively small proportion of Colstrip Units 3 and 4 construction employees that are assumed to go to work on the mine's construction is reasonable no matter what the union status of the proposed mine. Some operations workers can be expected to change mines should the Montco Mine go into production. Note for example letter 39. Note also that when the nonunion Spring Creek Mine opened some workers moved to it from the union Decker Mine.

DDD See letter 21, answer C. The EIS does not stress improved record keeping to the degree you suggest. Note that if we did not qualify our statements in this way we would be misrepresenting what is known about the effects of boom town growth. Professionals disagree about why social problems increase in a boom town setting. We have presented the opposing opinions. Note that your viewpoint is in fact represented in the EIS.

EEE The text has been revised to account for the two-year delay in the start of construction for the Montco Mine. Note that the impact projection is not particularly sensitive to moderate changes in the underlying assumptions.

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Colstrip workers who supposedly going to work for Montco based on a certain workforce schedule at Colstrip? What happens if the Montco project is delayed and the Colstrip project finishes earlier than expected? What if Montco is ready to begin construction, but delay has necessitated the continuation of construction at Colstrip? Wouldn't this change the impact analysis by bringing in a greater percentage of non-local workers?

FFF The housing assumption has a large percentage of Montco workers living in Colstrip (Table III-8 DEIS). If the work-force schedules don't mesh, what would happen to the projected residential distribution? What is Montana Power Company's position on this assumtpion that the largest percentage of Montco's workforce live in Colstrip?

GGG On what basis was it determined that the Northern Cheyenne would comprise 15% of the construction workforce? Is this assuming that Montco will have an active Indian hiring and training program? Has Montco agreed to such a percentage or program? Without an affirmative program, this percentage could be much lower and result in a larger influx of non-local workers.

HHH What will be the housing and fiscal impacts in Ashland or Broadus if the residential distribution assumption of Colstrip being the center of impact is changed? Has Montco agreed to either provide housing or financial assistance for housing?

III The DEIS lists about twenty possible mitigating measures that Montco or "some public agency" could take (DEIS p. IV-4). Which public agency is being referred to? Has Montco agreed to any of the suggested measures, (DEIS pp. IV-4-7) to offset the adverse social and fiscal impacts resulting from their proposal?

JJJ The State of Montana is directed by its Constitution to "maintain and improve a clean and healthful environment in Montana for present and future generations" (Montana Constitution: Art. IX, Sec. I(1)). Also, the Montana Strip and Underground Mine Reclamation Act has as one of its objectives to "promote the health and welfare of the people". (MCA 82-4-201, et al). Furthermore, the Montana Environmental Policy Act declares that:

> it is the continuing policy of the State of Montana, in cooperation with the federal government and local governments and other concerned public and private organizations to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to created and maintain conditions under which man and nature can co-exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Montanans. (75-1-103).

FFF The residential distribution is not particularly sensitive to the work force schedule. The largest percentage of Montco operations workers would not live in Colstrip but rather in the Ashland area (the sum of the Rosebud County Ashland area and the Powder River County Ashland area is 44 percent of the 1985 through 2006 operations workers; Colstrip's percentage is 24).

GGG The basis for the Northern Cheyenne participation rate was their current participation rate for operations in and around Colstrip. No assumption was made concerning any active hiring and training program.

HHH See answers EEE and FFF . Montco has indicated that it would not provide housing or financial assistance for housing.

III No specific public agency is being referred to in the draft EIS. Possible public agencies would include Rosebud County, Powder River County, a special district established in the Ashland area, and a variety of state and federal agencies. Montco has not agreed to any of the measures identified in the EIS.

JJJ Comment noted

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We submit that the Montana Department of State Lands has the authority under the Montana Environmental Policy Act, SUMRA, and the Montana Constitution to deny this permit because of signifcant adverse social and economic impacts on the human environment of the area.

Further, if the State does not deny the permit, we request that they put forth as stipulations all the proposed mitigating measures as noted in Chapter IV, DEIS.

IMPACTS OF PROJECT FAILURE

KKK The very real possiblity that the Montco Mine/Tongue River Railroad venture will fail must be addressed in the impacts section of the DEIS.

The "quick boom and soon bust" scenario is a common one today. The Montco Mine and railroad were envisioned in the early seventies to deal with a projected energy supply crisis. That supply crisis has twisted into an over-supply crisis in the Powder River Basin coal industry, with large numbers of Montana and Wyoming miners laid off at existing mines. Today's energy needs and the needs of the 1980's and 1990's are shifting from coal-based technologies to renewable and energy-efficient technologies. (See also our Introduction.)

New technologies developed in response to newly defined energy needs rely less on scraping and digging for coal. Instead, experience and research points to wiser use of resources and rapid change-over to renewables.

These changes in energy needs are reflected in the current and anticipated future marketplace. Conservation and efficiency technologies are highly sought. At the same time, the large-scale coal and nuclear technologies have lost appeal. Although these technologies have a place in our future energy "mix", there is no room for the mammoth scale of development that the proposed Tongue River development would bring. In Monte Canfield's phrase, they are future technologies whose time has passed.

Montana's Environmental Policy Act requires that agencies prepare a detailed statement on the environmental impact of the proposed action (MCA 75-1-201(2)(c)(i)) on the human and physical environment. Issuing the Montco Mine permit carries with it the real danger that this project will be started and then abandoned. The result could be 1) a shift in the burden of reclaiming the mine area and railroad to the State of Montana; and 2) extreme social impacts of the type now being experienced in the oil shale areas of Colorado (i.e. Battlement Mesa, Grand Junction, Parachute, et al).

KKK The Montco development is much smaller than the Colorado oil shale development and caution should be used when comparing the two. The possibility of project failure is addressed in appendix 9.

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The responsiblity of carrying out the State policy to ". . . prevent and elminate damage to the environment and biosphere and stimulate the health and welfare of man . . ." (MCA 75-1-102) rests in this case with the Department of State Lands. As part of that responsiblity, DSL should address the impacts of the potential failure of the Montco Mine in a supplement to the DEIS.

LAND USE IMPACTS FROM THE TONGUE RIVER RAILROAD

LLL In describing the scope of the analysis, DSL notes that a railroad is proposed to service the mine. (I-1) The analysis is inaccurate unless it clearly states that a railroad is required to make the mine servicable.

MMM In light of this, the statement in the Summary section of the DEIS (p. iv) that "the mine would not significantly affect the pattern of land uses in the region" is incorrect. The connection between the Tongue River Railroad and the Montco Mine is clear. It should be made clear in the assessment of environmental impacts pursuant to Sections 26.2.602(10) and 26.2.605 of the Montana Environmental Policy Act. The necessary information should be made available by the applicant and should be used in much more detail in the DSL analysis.

Without these changes, the DEIS is unclear and misleading concerning the impacts of the proposed action. Please refer to the comments of Greg Waldie for a more detailed description of TRRR's impacts on agricultural operators. See also the attached letter from former Lands Commissioner Leo Berry stating that the railroad would be addressed in the mine EIS.

CULTURAL RESOURCES

The DEIS notes that there are 22 cultural sites in the mine area that are eligible for the National Register of Historic Places. Sixteen of the 22 would be adversely affected by mining and of these 16, 11 prehistoric sites would be destroyed. These sites are considered valuable for their potential to provide an understanding of Montana's prehistory. (DEIS p. II-85)

NNN In the summation of impacts (DEIS p. III-80), it is stated that all sites would be excavated, recorded and analyzed prior to mining (emphasis added). Has Montco agreed to this? Has a plan been submitted that would be necessary to preserve the integrity of these sites? Will the DSL in conjunction with the State Historic Preservation Officer insist upon this prior to permit approval? To not do so would violate the mandate and intent of the 1966 National Historic Preservation Act, and Executive Order 11593, and the Montana Strip Mine Act, Section 82-4-227.

LLL Please refer to page I-5 of the draft: "Transporting coal from the Montco Mine requires that a railroad be built."

MMM The land use changes due to the proposed Tongue River Railroad are summarized on page III-75 of the draft EIS. The impacts are discussed to the extent that they would increase the magnitude of the effects of the Montco mine. The Montco mine would disturb about twice as many acres as the proposed railroad and in the cumulative scenario more than 7 times as many acres would be affected. Despite the changes, the regional land use pattern would continue to be overwhelmingly dominated by grazing land. Mr. Waldie's comments (testimony 4) are more concerned with changes in management practices that could be required by the proposed railroad rather than changes in land use.

NNN The State Historic Preservation Office, the Office of Surface Mining, the Department, and Montco are required to work together to create and monitor the mitigation plan. No permits, either antiquities or mining, can be issued until agreement between the company and the three agencies is reached. Such an agreement would be designed to assure that legal requirements are met. Montco's proposed mitigation plan is on file with state and federal agencies and is being reviewed for compliance.

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OOO Furthermore, some of these sites such as Katydid (24RB226), and King Creek (34RB221) do have the characteristics that have yielded and may be more likely to yield information of cultural, historic, archeological, and scientific significance in history and prehistory. Both of the above-mentioned sites may be extremely important to documenting the Plains and Late Plains Archaic groups. The irreparable loss of information from these and other sites within the proposed mine area cannot be allowed. Because of the potential significance of these sites, the DSL must selectively deny those portions of the mining permit that would affect these sites under MCA 82-4-227(2)(d).

PPP We would also request that the DSL provide a brief narrative of the sites eligible for nomination to the National Register. (See p. II-123, Rosebud Mine Area C, Block I EIS)

QQQ Why was the Fenceline site omitted from the summation in the DEIS?

RRR Also, did the survey undertaken include sites or potential sites that may be affected by associated development such as housing or commercial development that would be a direct result of the Montco project?

SSS Has the State in cooperation with the Northern Cheyenne satisfied all the requirements of the Native American Indian Religious Freedom Act of 1978?

PUBLIC HAZARD

Section 82-4-227(7) MCA states that "if the Department finds that the operation will constitute a hazard to a dwelling house....or other public property, the Department shall delete the areas from the....strip mining permit before it can be approved." The location of the proposed mine, railroad loop and loading facilities would create such a hazard to downstream property owners and Ashland if the Tongue River Dam fails. The unsafe and hazardous condition of the dam is well documented. (We refer you to the Montana DNRC Water Resources Division.) The State has taken the position that its number one priority concerning the dam is to alleviate the potential for a catastrophic dam failure.

TTT The Montana Department of State Lands (DSL) has the responsibility to selectively deny those portions of Montco's proposed strip mine that could prove hazardous in case of dam failure. If the State does not selectively deny these portions of the Montco Mine, is it then accepting liability for damages caused by these facilities within the permitted area in the case of such an event?

OOO Both sites were nominated for listing in the National Register. Table II-27 has been adjusted to reflect the State Historic Preservation Office's comments; all sites are included in the table because they meet the "yielded and will yield" criteria for nomination. The Department, the Preservation Office, the Office of Surface Mining, and the company are discussing mitigation needs for the two sites. The National Historic Preservation Act and Executive Order 11593 and SUMRA do not require selective denial. They do require protection of the information, which can be afforded in several ways.

PPP Changes in table II-27 offer some additional information about the sites. More information is available from the Department and the State Historic Preservation Office. Specific details are not published in EISs in order to avoid destruction by vandalism.

QQQ This was an error. The revised table II-27 does discuss Fenceline (site 24RB223).

RRR The survey, as required, only covers the permit area and a one mile buffer zone. Cultural surveys are not for the purpose of identifying potential developments.

SSS The American Indian Religious Freedom Act (PL 95-341, 1978) is designed to assure "access to [religious] sites, use and possession of sacred objects, and freedom to worship through ceremonials and traditional rites."

The Northern Cheyenne Planning Office Report (Aug., 1981) analyzed potential impacts of the proposed mine on the culture and religion of the Northern Cheyenne. The report did not identify negative impacts of the mine on sites significant for religious activities.

Montco has submitted a mitigation plan for significant cultural resource sites that would be affected by the mine. The plan provides for data collection and consultation between the company, the tribe, the Department, the State Historic Preservation Office, and the Office of Surface Mining to determine religious significance of the sites. Research has not yet shown any of the sites to be significant for Northern Cheyenne religious practices. Work with the tribe and data collection from the sites would increase understanding of the sites' function, period of use, and tribal association.

TTT To quote the Department's letter of October 12, 1983 to the Northern Plains Resource Council:

> Meetings have been held with the Department of Natural Resources and Conservation, and DSL has reviewed both the Tongue River Dam Emergency Warning and Evacuation Plan (July 1, 1982) and the Tongue River Rehabilitation Project (October, 1981) reports. The following preliminary conclusions were reached:
>
> 1. The rail loop at Montco will probably remain at least 20 feet above the projected flood level and most of the rail loop is completely above projected flood levels.
>
> 2. None of the facilities area is likely to flood.

LETTER 48

TRANSMISSION LINE

UUU A very brief mention is made in the DEIS that power for mining operations would be supplied by a 69 KV powerline built from Ashland to the facilities area. Why wasn't a description of this transmission line project included in the DEIS? Also, are existing lines to Ashland sufficient to carry the anticipated load, or would a new line have to be built? The scope of this project, its cost, and who assumes the financial obligation should be included in a supplemental DEIS.

Respectfully submitted by

Margaret E. MacDonald
Margaret E. MacDonald

P Russell Brown
P. Russell Brown

Dennis J Unsworth
Dennis J. Unsworth

3. There will be a minimum of 5-hours lead time from the point at which the dam breaches to the point where the flood waters reach the floodplain adjacent to the Montco site. Thus, there is sufficient time to evacuate any rail cars in the vicinity to higher ground. In all probability railcars would be removed from the area long before the dam breached because

a) the weather (i.e. a long period of continuous rainfall or snowmelt) and DNRC would provide additional warning that the dam may be reaching capacity, and

b) it seems unlikely either the railroad or the mine would pursue a course of action that would assure the loss of rail cars.

Analyses of the flood flows resulting from breaching of the Tongue River dam indicate that neither the relocated county road, the rail loop, nor the topsoil stockpiles would be affected by flooding (HKM Associates, 1982; Intrasearch, 1983).

UUU See answers to letter 22. The route of the power line that would be constructed from Ashland to the mine is not known. In all probability the Tongue River Electric Cooperative would determine the route of the line, which would probably continue south to Birney. Exactly how the lines would be paid for is also unknown; however, Montco must guarantee the Tongue River Electric Cooperative enough revenue to pay for the lines over 30 years.

Load on the lines into Ashland is rapidly approaching the point where existing lines will have to be upgraded regardless of Montco's demand. Power demand by Montco would in part determine how the lines are upgraded.

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LETTER 48

DEPARTMENT OF STATE LANDS

THOMAS L. JUDGE, GOVERNOR
CAPITOL STATION
STATE OF MONTANA
(406) 449-2074
(406) 449-4560 RECLAMATION DIVISION
1625 ELEVENTH AVENUE
HELENA, MONTANA 59601

LEO BERRY, COMMISSIONER

REC'D DEC 5 A.M.

December 2, 1980

Kathy Warden, Office Manager
Montana Beef Performance
Animal Science Building
Montana State University
Bozeman, MT 59717

Dear Ms. Warden:

I am in receipt of your recent letter regarding the proposed Tongue River Railroad.

I appreciate your concerns, however, the Department of State Lands has no jurisdiction over the siting or construction of the railroad once it leaves the mine site. You may be aware that the proposed railroad is associated with, but independent of, the mine proposal submitted by Montco. The mine permit application is subject to review by this department, and ultimately a decision will be made whether or not to issue a permit for the mine. As part of our review an environmental impact statement must be prepared on the mine and its associated impacts. The construction of the railroad will be addressed in the impact statement even though we have no jurisdiction over it. Hopefully the evaluation contained in the impact statement will provide some of the solutions you suggest in terms of minimizing impacts.

Your letter will be included in the department's files to assist in the preparation of the impact statement. Thank you for writing.

Sincerely,

Leo Berry, Jr., Commissioner
Department of State Lands

cw

c: Ralph Driear

AN EQUAL OPPORTUNITY EMPLOYER

LETTER 49

HRA HISTORICAL RESEARCH ASSOCIATES
P.O. Box 7086
Missoula, Montana 59807 (406) 721-1958

July 9, 1982

RECEIVED
JUL 12 1982
STATE LANDS

Mr. Gareth Moon, Commissioner
Department of State Lands
Capitol Station
Helena, MT 59601

Re: Review of Draft Environmental Impact Statement,
Montco Mine

Dear Mr. Moon:

I have reviewed the "Draft Environmental Impact Statement, Montco Mine, Rosebud County, Montana." Generally, I believe that the document is well-prepared and that it presents an adequate analysis of the potential impacts from the construction and the operation of the Montco Mine and other potential mines in the Ashland/Birney area. As you know, some of the data on transportation, land use, and socio/economic cumulative impacts were derived from material that HRA has prepared in connection with the environmental assessment of the proposed Tongue River Railroad. Some of the information that appears in the Montco DEIS was misinterpreted from the data that I supplied to the Department of State Lands. In separate written and oral communications with the Department's EIS team, I have noted the necessary changes. With regards to other aspects of the document, I would offer the following comments:

A 1. On page II-78 the authors stated that within the project area (Rosebud, Powder River, and Custer counties) "the road network is not well developed, but is generally adequate for the existing population." I would disagree with the statement that the road network is not well-developed. Given current developments in the area and plans for road improvement, the system in place is adequate. Indeed, our conclusion with respect to the proposed development in the area is that upgrading of some road segments may be required, but that the existing network of roads will meet increased travel demands.

2. On page III-38 of the Montco DEIS the authors state that, with emissions from FAS 566, "the primary Federal and Montana ambient air quality standards would probably be exceeded outside the proposed permit area boundary." Indeed, it appears from the DSL's analysis that the access road to the Montco mine would generate the greatest levels of particulate emissions in the project area.

B I have no disagreement with the fact that the FAS 566 would generate the greatest fugitive dust emissions in the project area. It should be noted, however, that these emissions result in only localized

A We agree that the road network is adequate. Nevertheless it is difficult to travel between many places in the area without taking a roundabout route.

B Montco's (1983, vol. 9, app. A, pp. A-102-103) air quality monitoring data from the Landing Field and Birney Day Village sites show that about 77 percent of the total suspended particulate is smaller than 3 microns in diameter. These small particles can remain suspended in the air and travel great distances from the source (Perera and Ahmed, 1978, p. 17).

LETTER 49

Mr. Gareth Moon
July 9, 1982
Page 2

ground-level total suspended particulate (TSP) concentrations, which decrease rapidly with distance from the road. Also, these emissions will most likely be produced at the time of shift changes at the mine and will occur only during approximately three separate short term (1 hour or less) periods during the day. The Ashland area exceeds TSP standards because the measurements were taken along a gravel road. Therefore, the Ashland area still is expected to exceed TSP standards no matter how little or how much TSP is emitted during Montco's operations along FAS 566.

3. Sociological impacts from the proposed development in the Ashland/Birney/Otter Creek region are extremely difficult to quantify. Overall, I have no disgreement with the statements that appear in the Montco DEIS. Most conclusions are appropriately qualified. Such qualifications are warranted given the quality of current data and knowledge with respect to energy development impacts.

C However, there are some statements, particularly relating to impacts to the Northern Cheyenne Indians, that are more categorical and indicate greater impacts than those that apply to the remainder of the population. For example, when speaking of possible impacts from inter-marriage within the Northern Cheyenne Indian people, the document suggests "This, in turn, might hasten the eventual loss of the Northern Cheyenne as a people." That conclusion is appropriately referenced to some Northern Cheyenne's concern of this occurring, but the possibility of that happening is difficult to assess. Statements such as "The Northern Cheyenne feel coal development would also exacerbate alcoholism and other chemical abuse" also is a difficult impact to identify and to quantify. It should be noted that the EIS team does reference material prepared by the Northern Cheyenne tribe and also is stating that these possible impacts are of concern to some tribal members. This qualification and the context in which these statements appear should be considered in reviewing the potential impact of proposed development to the Northern Cheyenne Indian people.

D 4. On page III-71 the authors state that in the cumulative scenario "Expanded long-term permanent and peak in temporary population influxes would require larger capital outlays, primarily in the early 1980s, several years before any additional tax revenue would be available. Later, however, taxable valuations for most of the jurisdictions affected by the Montco Mine would swell. Thus, during the 1990s and beyond, the property taxes would provide all essential funding."

I believe that these statements need some qualification. Our analysis indicates that some jurisdictions will experience fiscal problems in

You are right in implying that emissions would probably peak during shift changes. But you are incorrect in implying that air quality standards would be exceeded only during peak emissions. The standards are not a measure of peak TSP, but are a measure of average TSP concentrations over a 24-hour period. It is this average that would probably exceed the standards outside the permit area. The peak emissions 3 times daily would be much higher than the average.

The Ashland high volume sampler was located in strict accordance with EPA probe-siting criteria (Montco permit application, vol. 9, app. A, p. A-100) and is situated in a residential area. There are now people being exposed to TSP concentrations that exceed the National Ambient Air Quality Standards (NAAQS), which were set to protect human health. Although the NAAQS and Montana AAQS would probably continue to be exceeded regardless of Montco's operation, the potential for adverse health effects would increase as the TSP concentrations increased.

C Your comments are noted. Please refer to text changes in chapter II, Sociology and Community Services.

D The statement you refer to is in the Summary of Impacts section. The differences between jurisdictions are elaborated in the text that follows the summary.

LETTER 49

> the early years and that some are projected to experience net deficits throughout the analysis period. However, many jurisdictions also are projected to experience surpluses throughout the analysis period. Further elaboration of the differences between jurisdictions would be useful in the Montco DEIS fiscal analysis.

I believe that the Department of State Lands EIS team did a good job in preparing the Montco DEIS. The information is sufficiently detailed to identify clearly the potential impacts from the proposed Montco project and from other coal mining related activities in the area.

Sincerely,

Alan S. Newell

ASN:rh

LETTER 50

United States Department of Agriculture
Forest Service
Custer National Forest
2602 1st Avenue North
P.O. Box 2556
Billings, MT 59103

Reply to 2820

Date July 9, 1982

RECEIVED
JUL 12 1982
STATE LANDS

Gareth Moon, Commissioner
Department of State Lands
State of Montana
1625 Eleventh Avenue
Helena, MT 59620

Dear Mr. Moon:

We have completed a review of the draft environmental impact statement (EIS) on Montco's proposed coal mine near Ashland, Montana. I have the following concerns and comments regarding the document, the proposed action, and the suggested mitigation:

A 1. Table I-2, p. I-8. The units of measure for the columns headed "Facilities," "Mining Related," and "Reclamation" should be indicated. It is not readily apparent that the values represent acres.

B 2. Figures I-6 and I-7. The ownership symbols for the two maps should be the same. It might also be possible to combine the two maps and use a legend that would reflect both mineral and surface estate ownership.

C 3. Chapter II, A. Geology. Of what geologic age is the Fort Union formation? A stratigraphic column would greatly facilitate the overall understanding of the geologic and hydrologic setting of the proposed permit area.

D 4. Chapter II, 3. Topography and Geomorphology, a. North King Mining Unit, p. II-1. No mention is made of the buffer distance that will exist between the mined area and the National Forest System lands. On page II-1, it is noted that erosion is ". . . probably moderate to moderately severe . . . ." On page III-1, the last sentence indicates that "Area-wide settling . . . can be expected to occur . . . ."

E Therefore, because of the above concerns, combined with the height of the headwall (approximately 110 feet) at the common boundary, it is recommended that a buffer of at least one-quarter mile be provided between the mined-out area and the National Forest System lands. This would lessen the impacts to Forest Service lands due to settling, slumping and erosion.

A See text changes.

B The shading patterns have been changed so they match.

C The age of the Fort Union Formation has been placed at Paleocene (Mapel et al., 1977). A stratigraphic column of the Fort Union Formation was omitted, since numerous documents contain such an illustration. For a detailed stratigraphic column of the Fort Union Formation, refer to the Montco permit application (vol. II, app. Bb), U.S. Department of Interior and Department of State Lands (1979), or Mapel et al. (1977).

D Regulations require that a buffer zone at least 100 feet in width shall separate all mining activities from adjacent property lines unless a waiver by the adjacent landowner is granted. (See revisions in chapter I.) In this case, Montco would be allowed to mine no closer than 100 feet from the Forest Service property line.

E The Department believes a one-quarter-mile buffer is unnecessary. Neither highwall slumping, area-wide settling, nor erosion would affect Forest Service property. The probability of highwall slumping is remote because engineering and geotechnical considerations have determined the proposed highwall's location and height. Area-wide settling would affect only mined areas, which, of course, exclude Forest Service property. Erosion would not affect Forest Service surface, because surface drainage runs from Forest Service property toward Montco's North King unit.

LETTER 50

F 5. Chapter III, B. Hydrology, 3. Ground Water, page III-18. Mention is made of a well owned by the Forest Service ". . . that lies just north of spring 3 . . . ." Please provide us with a more accurate location of this spring so that the potential impacts to this well may be better estimated.

G Under the section on Hydrology in Chapter II, it was stated that the volume of groundwater moving through the coal seams is low. In Chapter III it is stated that little impact to groundwater is, therefore, expected. It is our concern that the opening of a large segment of the coal seam could effectively dewater the aquifer(s) supplying springs and wells on the National Forest lands east of the proposed permit area. These springs and wells are vital to the grazing program from both the rancher's standpoint and ours.

H In order to determine the actual impacts to the groundwater system we recommend a monitoring program for the water sources above the proposed permit area. This program should start immediately for base data collection and should continue throughout the life of the proposed mine and five years following the reclamation phase. Furthermore, if the springs and wells on the Forest Service lands are adversely impacted by the coal mining operations, we then expect the mining company to mitigate the impacts. Unfortunately, no direct mitigation proposals were offered--only a short statement of responsibility on page III-20. We feel that the mining company should have to replace the water in both like quality and volume, and that this proposal needs additional discussion.

I 6. We concur with your recommendation that Montco take advantage of the public relations opportunity and develop better working relationships with the governmental agencies involved, including the Forest Service. Currently, there appears to be little community/agency/company coordination. We further propose Montco take the initiative to establish a company/community/agency coordination group, to include the Forest Service, for the purposes of hearing and addressing social and environmental impacts related to coal development.

Due to the probability of increased recreational and wildlife impacts (camping, hunting, ORV's, etc.) on National Forest System lands as well as impacts to the community, some type of coordination group needs to be established to address and deal with these impacts.

Sincerely,

JAMES F. MANN
Forest Supervisor

cc:
D-4

F The statement in the draft EIS regarding owners of wells potentially affected by mining activities is in error. The Forest Service well that could be affected is located in the northwest corner of section 12. The other well described, owned by B.M. Haley, lies just north of spring 3, in the northeast quarter of section 5. The text has been corrected.

G Impacts to wells and springs other than those identified in the EIS are unlikely. Predictions of which wells and springs may be affected by dewatering of the mined coal seams rely on analysis of appropriate hydrogeologic data using accepted techniques. Perhaps the most important consideration is that many wells and most springs on Forest Service land east of the North King unit lie in stratigraphically higher geologic units than those to be affected by mining. These higher units are not directly connected hydrologically with the units to be dewatered.

Available information suggests the direction of ground water flow is to the northwest in the North King unit. The various aquifers are apparently recharged in the uplands of the Custer National Forest and discharge to the Tongue River alluvium to the northwest. Therefore, it is unlikely that upgradient springs and wells would be affected, given the low permeability of the aquifers and the relatively short time the mine pits would be open. Following mining and backfilling of the pit, the local ground water system would reestablish itself and saturate the spoil. Ground water would again flow to the northwest and the Tongue River.

If wells and springs are affected on adjacent land upgradient of mining activities, they could be replaced with alternative ground water sources available in the area. Montana law requires a coal company to replace all water supplies damaged by mining.

H The Department has concluded, based on results of a computer model presented in Montco's permit application (vol. 5, chap. V), that wells and springs owned by the Forest Service are beyond the influence of pit drawdown. Therefore, the monitoring program established did not include Forest Service springs and wells. Alternative ground water sources have been identified by Montco in and adjacent to the permit area. These sources include the Hell Creek Formation and the Tullock Member of the Fort Union Formation, both of which lie stratigraphically lower than the coal seams to be mined.

Montco has submitted a monitoring plan as part of its permit application that would allow detection of off-site impacts to wells and springs. Adjustment and expansion of this plan can be made as necessary.

I Your comments are noted. Thank you.

LETTER 51

Broadus Stage,
Miles City, MT 59301
July 9, 1982

RECEIVED
JUL 12 1982
STATE LANDS

Gareth Moon, Commissioner,
Department of State Lands,
1625 Eleventh Avenue,
Helena, MT 59620.

Dear Sir:

As a concerned member of the agriculture community I would like to make comment on the Montco Mine Draft Environmental Statement.

It seems to me in reading their statement that they have not adequately answered the many questions relating to the cumulative hydrological impact this mine and the further proposed mines will have on the Tongue River valley and the ground waters surrounding it.

We are farmer-ranchers, living 5 miles south of Miles City. My husband, Boyd, has lived and worked this ranch since he was 3 years old. Our sons, Richard and Michael, are taking over the operation and they will be third generation occupants of this land. I feel their heritage is being jeopradized with the proposed opening of these mines in the upper Tongue River valley.

We use the water from the Tongue and Yellowstone irrigation canal to raise corn, alfalfa, oats and wheat, so we are most concerned about what the quality of the water in the Tongue River will be when and if these mines are opened.

A The Tongue and Yellowstone Irrigation District will be 100 years old in 1985. Water is the life blood of these valleys. This canal waters over 10,000 very productive acres. Many millions of dollars of crops have been the end product of this canal. It has been the financial backbone of this area for these many years. Will the quality of water in the Tongue River be such that it will not be fit to use for irrigation purposes? Where then will this leave these farmers who are dependent upon this water from the Tongue River if it becomes so polluted?

B I believe another look at the model used in assessing the impacts should be made and that low flow instead of maximum instream flow should be considered; also, I take exception to the statment that "the increase in TDS levels would be insignificant compared to projected TDS levels with increased irrigation in combination with no mining in the area". I believe that increased mining, plus increased irrigation will have significant irrigation hazards downstream.

I do believe that a supplement to this Draft EIS should be made and that some of the very glaring misstatements and inadequate answers should be cleared up before a decision to grant this mine permit is granted.

Yours truly,

Margaret Blum

Mrs. Boyd C. Blum,
Member, Tongue River Agriculture
Protection Association,
Broadus Stage,
Miles City, MT 59301

A The quality of water in the Tongue River would remain adequate for irrigation. As stated in the draft EIS (app. 5), two modeling techniques were used to predict impacts to the quality of the Tongue River due to Montco's proposed mining activities. Both models, using data representing the worst of circumstances, predicted insignificant impacts to Tongue River water quality from mining of the entire 24-year life-of-mine area. The Woods computer model (1981) was also used to predict the impacts of all anticipated mining on the Tongue River drainage under the worst of circumstances. The results of this analysis also demonstrate insignificant impacts to Tongue River water quality from mining. (See chapter III, Hydrology.)

B Your comment is noted. Additional scenarios were incorporated into the Woods model (1981), including historic low flow of the Tongue River in combination with all anticipated mining. (See chapter III, Hydrology.) Results of the computer simulations do not differ from values in appendix 5 of the draft EIS. We conclude that the expected increase in dissolved solids concentrations associated with all anticipated mining along the Tongue River would be insignificant.

As for increased irrigation, computer simulations show signficiant increases in dissolved solids concentrations. If increased irrigation is combined with mining, significant increases in dissolved solids concentrations would occur. But the increases would result from return flows from irrigation, not from mining. See text revisions, chapter III, Hydrology.

LETTER 52

RECEIVED
JUL 12 1982
STATE LANDS

July 6, 1982

Mr. Gareth Moon
Department of State Lands
Capitol Station
Helena, Montana 59620

Dear Mr. Moon:

I have recently began operating a buisness in Ashland, Montana. I have followed the Montco mine project and discussed it with people here in Ashland. I was not able to attend the meeting your office recently held on the Montco Draft Environmental Impact Statement.

The opening of a mine in this area would help buisness in Ashland as well as provide jobs for people who are unemployed or who commute to other area mines for work. The development which would take as a result of opening a mine would help improve other services or support services which we do not have now.

The coal severance tax which a mine would pay to the State would more than provide these services and growth. I realize that these tax monies would not take care of some problems created by opening of a mine, such as housing. There are people who are interested in developing their land for housing development. I am sure that other people would come in to help with development of things the community would need.

Thankyou for reviewing my comments.

Sincerely,

Thank you for commenting.

LETTER 53

TONGUE RIVER RAILROAD COMPANY
1500 Poly Drive, P.O. Box 1181
Billings, Montana 59103
(406) 252-5695

RECEIVED
JUL 12 1982
STATE LANDS

July 9, 1982

Mr. Gareth Moon, Commissioner
Montana Department of State Lands
Capitol Station
Helena, MT 59601

RE: Draft Environmental Impact Statement, Montco Mine, Rosebud County, Montana

Dear Commissioner Moon:

Thank you for providing the Tongue River Railroad a copy of the above Draft Environmental Impact Statement. Tongue River Railroad Company appreciates the opportunity to submit comments regarding the Environmental Impact Statement. There were numerous references in the Draft Environmental Impact Statement for the Montco Mine to the Tongue River Railroad as well as constant reference at the public hearing held on June 3 in Ashland, Montana. Strictly for information purposes, I am submitting to you relevant data involving the Tongue River Railroad Company.

A HRA of Missoula has been commissioned to prepare the Draft Environmental Impact Statement for the Tongue River Railroad project under the supervision of the Interstate Commerce Commission It is my understanding that they have filed comments to you directly. As you know, the Department of State Lands in June, 1980, was designated a cooperating agency with the Interstate Commerce Commission in preparation of the Draft Environmental Statement. To this end, Mr. Newell has been working with your staff and the ICC in preparation of the TRRC document which is scheduled for release to the public sometime in late 1982. Mr. Newell's comments should be considered and made part of the record.

B TONGUE RIVER RAILROAD COMPANY BACKGROUND
The Tongue River Railroad Company is a limited partnership existing under the laws of Montana. General partners include DS Cartage Corporation, a subsidiary of Diamond Shamrock Oil Company of Dallas, Texas; Thermrail, Inc., a wholly owned subsidiary of Washington Energy Company of Seattle, Washington; Wesrail, Inc., a subsidiary of Wesco Resources, Inc., of Billings, Montana; and Otter Creek Transportation Company, a subsidiary of Conoco.

A [The draft ICC document was released in early 1983.] Mr. Newell's comments have been noted. See letter 49.

B Thank you for this information.

LETTER 53

Mr. Gareth Moon
July 9, 1982
Page 2

The above referenced partners are energy and natural resources firms with coal interests in the Ashland/Birney/Otter Creek areas of Southeastern Montana. It is conservatively estimated that 10 billion tons of subbituminous coal lie in this area. Currently, transportation does not exist to haul these rich coal deposits to upper Midwest and Pacific Northwest markets.

In early 1980, after efforts failed to persuade the dominant Montana carrier, Burlington Northern, to proceed with determining the feasibility of rail transportation to the area in question, the above mentioned entities commenced financial and engineering studies for construction of a rail transportation system in Southeastern Montana. Peat, Marwick, Mitchell & Co. of Washington, D.C. was selected to initiate financial studies and IntraSearch, an engineering firm of Billings, Montana, was selected to conduct photogrammetry work and preliminary engineering on two alternative alignments, the first from Ashland to Colstrip and the second from Ashland to Miles City. A decision was made in late 1980 to collect as a proposed action the Miles City route. The proposed line commences approximately one mile west of Miles City and proceeds south along the west side of the Tongue River, approximately 63 miles where it crosses the Tongue River eight miles north of Ashland, Montana. From this location, the line continues on the east side of the Tongue River around Ashland where it divides into two points. The first is along the Tongue River 8.9 miles to the Montco project site and the second is 7.6 miles along Otter Creek.

ALIGNMENT CRITERIA

C The alignment was designed to avoid people, homes and subdivisions; avoid irrigated agricultural lands; avoid floodplains; and to achieve railroad engineering standards of 1% grade and 4% curvatures.

As far as facilities are concerned, an interchange yard as well as an office and shop facilities will be located in Miles City. In Ashland, only a maintenance of way and signals and communication shop is planned. As far as employees are concerned, the labor force for the railroad will be based primarily in Miles City, Montana.

STATUTORY AND REGULATORY REQUIREMENTS

D The Tongue River Railroad Company will be filing for a Certificate of Public Convenience and Necessity from the Interstate Commerce Commission under Title 49 Part 1120. An Environmental Impact Statement is required under the provisions of the National Environmental Policy Act. This task is well underway with a

C Thank you for this information.

D Thank you for this information.

LETTER 53

Mr. Gareth Moon
July 9, 1982
Page 3

distribution of the draft by the Interstate Commerce Commission sometime in late 1982, which will accompany the application to the Commission. Other approvals needed include right-of-way easement deeds across lands owned by the United States and maintained by the Bureau of Land Management in the U.S. Department of Agriculture. In addition, U.S. Army 404 Dredge and Fill Permits are required for two crossings of Otter Creek and one of the Tongue River. There are approximately three state school section lands maintained by the Department of State Lands in the proposed action.

Since March, 1980, the project has been underway and it is planned that the application be filed in late 1982. It is anticipated that the project will be approved sometime in late 1983 and right-of-way purchase will occur. Construction will begin in late 1983 or early 1984 with the completion date scheduled for 1986.

E The Tongue River Railroad is most supportive of the Montco Mine project and believes that the Draft Environmental Impact Statement has fully complied with the Montana Environmental Policy Act. The Tongue River Railroad Environmental Impact Statement will not only assess the impacts from the construction of the railroad line itself, but will also address impacts caused by the construction and operation of a number of mines in the Tongue River area. We believe that the Department of State Lands has done a credible job in assessing the impacts to the area resulting from construction and operation of the Montco Mine.

Should you have any further questions, or would like responses to specific questions or comments raised at the June 3 public hearing, please so advise.

Thank you for the opportunity to comment on this document.

Very truly yours,

Thomas E. Ebzery

Thomas E. Ebzery

TEE/lms
Enc.

E Thank you for commenting.

LETTER 54

NORTHERN PLAINS RESOURCE COUNCIL

Field Office
Box 858
Helena, MT 59601
(406) 443-4965

Main Office
419 Stapleton Building
Billings, MT 59101
(406) 248-1154

Field Office
Box 886
Glendive, MT 59330
(406) 365-2525

JUL 13 1982

Gareth Moon
Commissioner
Montana Department of
State Lands
1623 Eleventh Ave
Helena, Montana 59601

July 12, 1982

RE: Montco DEIS

Dear Commissioner Moon,

We would like to repeat our request that all comments, oral and written, that were given or submitted at the June 3, 1982 Montco DEIS hearing, be printed and responded to in a supplemental EIS. This would insure that all input is available to the public and not lost in the decision making process.

We appreciate your cooperation in this matter, and look forward to hearing from you at your earliest possible convenience.

Sincerely,

Russ Brown

Russ Brown
NPRC Staff

cc: Brace Hayden
Kit Walther

All written and oral hearing testimony has been printed and answered in this final EIS. See testimony numbers 1 through 14.

LETTER 55

MONTANA COAL COUNCIL
406·442-6223 2301 COLONIAL DRIVE · HELENA, MONTANA 59601

July 12, 1982

RECEIVED
JUL 13 1982
STATE LANDS

Gareth Moon, Commissioner
Department of State Lands
Capitol Station
Helena, MT 59620

Re: Montco EIS

Dear Commissioner Moon:

On behalf of the Montana Coal Council I am pleased to offer the following comments on the Montco EIS.

A I note that the EIS totally ignores the gross proceeds tax that will be paid on the coal, pages III-71 and III-83. It would appear that these taxes will be approximately 2.8 million dollars at the 6 mtpy level and 5.6 million dollars at the 12 mtpy level on an annual basis. These taxes will be paid to Rosebud County and assumably will go to the area impacted by the proposed mine.

B Page IV-6 states that "The adverse fiscal impacts caused by mine development arise from either poor distribution of tax revenues among affected jurisdictions or receipt of revenues well after they are first needed. . ." It is then suggested that the prepayment of taxes and other methods could be utilized by Montco to mitigate the impacts.

The Coal Board, pursuant to 2-15-1821, MCA, receives 8.75% of the coal severance tax imposed by 15-35-108, MCA. By the close of fiscal year 1981-82 in excess of $43 million has been allocated to that fund. In fact the town of Ashland has already received the following grants from the Coal Board:

$45,000	Fire Department
71,080	Water and Sewer
800,000	Elementary School
102,844	Sewer Repair
101,400	Sewer Repair
$1,120,324	

A The "gross proceeds tax" is not a tax per se but rather is taxable value of the coal for property tax purposes. The taxable value of the coal produced by the Montco Mine was included in the fiscal impact analysis. At 1980-81 tax rates, at 6 million tons per year of coal production, and assuming a $7.50 contract sales price, Rosebud County would receive $313,000 per year and the school districts would receive about $1.2 million per year.

B Comment noted.

LETTER 55

Commissioner Gareth Moon
July 12, 1982
Page 2

C It should be further noted that for the past few years the funds allotted to the Coal Board were not in enough demand to utilize all of the funding allocated and funds were reverted to the Education Trust Fund.

Whatever other problems may occur with funding going to the needy entities should either be resolved between themselves or by the Legislature.

In addition to the direct benefits from the taxing of the coal, facilities and equipment, the operation of the mine would provide approximately 12,000 man years of employment and over $4000,000,000 in wages over the 24-year life of the mine.

Not only will the local area benefit but the region, state and nation will also.

Sincerely,

James D. Mockler
Executive Director

JDM:dmw

cc: Lanny Icenogle

C Thank you for your comments. We assume that the $4000,000,000 figure contains a typographical error. Even at $400,000,000, however, your figure is greater than the one we have. According to a memo dated February 2, 1981, submitted by Montco, the total payroll over the life of the mine would amount to about $273,866,000 (in 1980 dollars). Of this, $24,830,000 would be for the construction work force and $249,036,000 would be for the operations work force. Total man years of employment would amount to 9,095, 825 for construction and 8,270 for operations.

LETTER 56

Billings Area
CHAMBER OF COMMERCE

RECEIVED
JUL 8 1982
STATE LANDS

July 7, 1982

Mr. Gareth Moon, Commissioner
Montana Department of State Lands
Capitol Station
Helena, MT 59620

Dear Commissioner:

The Billings Area Chamber of Commerce has reviewed the draft environmental impact statement on the Montco Mine permit application for Rosebud County, Montana, published by your department. Would you please accept this letter as an exhibit in support of the purposed Montco Mine Project.

The Billings Area Chamber believes that the proposed project would have a positive economic affect on eastern Montana in the way that readily offsets the minor disadvantages of the project as pointed out in the report. The report clearly defines the limited impact -long term- of the proposed mining operation. We believe that Montco has shown good faith concern for the environment in its plans for mining and moving the coal to be removed. We further believe that state and federal legislation available to the enforcing agencies will assure the quality of the mining operation and the reclamation of the mined area. We urge your favorable consideration of this proposal.

Respectfully submitted,

James B. Spring

James B. Spring, President
Board of Directors
Billings Area Chamber of Commerce

JBS/pw

P.O. Box 2519 • Billings, Montana 59103 • (406) 245-4111

Thank you for commenting.

LETTER 57

The Big Sky Country

MONTANA STATE HOUSE OF REPRESENTATIVES

Rep. Cal Winslow
House District No. 65
1240 Crawford Dr
Billings, Montana 59102

Committees
Human Services Vice-Chairman
State Administration,
Highways & Transportation

July 7, 1982

RECEIVED
JUL 8 1982
STATE LANDS

Mr. Gareth Moon, Commissioner
Montana Dept. of State Lands
Capital Station
Helena, Montana 59620

Dear Mr. Moon:

I appreciate this opportunity to comment on the draft Environmental Impact Statement for the proposed Montco mine.

A I find it interesting in chapter IV that so much emphasis is on the negative effects that will be placed on the area and very little attention is given to the jobs that will be made available or the tax revenue that will come to the state. If my figures are correct, with our present severence tax at 6 million tons per year, the state will receive $13,500,000 in tax revenue. What more do we want? Isn't one of the reasons for the 30% tax to deal with impacts? Now are we asking the companies to pay the 30% and take care of the impacts as well?

B As the Chairman of the Coal Tax Oversight Committee this past year, I have been able to review the work of the State Coal Board. It is the purpose of this board and the earmarked funds to deal with some of the listed areas of concern such as sewage, water, housing, schools and health needs. In fact, Rosebud County has been receiving 50% of all the funds administered by the board.

In the future, if we are going to note the impacts due to a development, I would suggest we recognize the positive aspects as well as the negative.

Sincerely,

Cal Winslow

Cal Winslow
Representative

A The purpose of chapter IV in the draft is to identify means of mitigating only those impacts that would be negative. A full treatment of all impacts, including the positive, is given in chapter III. For the final EIS, the mitigating measures have been moved to chapter III, along with the impacts they address.

The mitigating measures listed include both those that could be paid for by the severance tax and those that could be implemented by Montco or some government agency. We do not in the EIS advocate the adoption of any particular measure. Those stipulations that would be attached to Montco's permit would not be determined by the Department until the permit decision is made, which comes after publication of the final EIS.

B Comment noted.

LETTER 58

MRS. E. M. DANIELS
5 A RANCH
BIRNEY, MONT. 59012

July 6, 1982

RECEIVED
JUL 8 1982
STATE LANDS

Mr. Gareth Moon,
Comm. of State Lands,
Helena, Mont.

Dear Commissioner Moon:

My husband and I are requesting that both you and the Governor reject, at this time, the MONTCO permit for a new mine along Tongue River.

A It was so disturbing to hear you tell me in Ashland that though you personally feel this mine may not be necessary or proper at this time, but that it would probably be permitted. We feel if you are courageous enough to make a statement like that - then you also should have the courage to deny the permit at this time.

B When all coal mines in Montana are operating far less than their capacity, it is wrong to permit an area that has no existing mines.

C It is, of course, the business of state administration, such as your position and that of the Governor, to encourage and want further industry for the state, but at the same time, it is your responsibility also, to the good of the WHOLE state - not just a segment of industry. If the coal is there - it will not go away and can always, in future years, be mined, though obviously, all testimony and facts point to the impossibility of reclamation of that area.

D Please know we reject the technical and socialogical reasoning for this mine, and we request you do the same.

Sincerely,

Copy to Gov. Schwinden

Your comments are noted. Thank you.

LETTER 59

RECEIVED
JUL 8 1982
STATE LANDS

Mr. Garth Moon
Commissioner of State Lands ,

Re. MONTCO MINE-DEIS

A I Believe the mine will be an asset to the area for several reasons. Mainly it will increase the local tax base. It will create some badly needed jobs in an area where they are needed, the result of the local sawmill going bankrupt.

B It will also make it possible to have a much needed high school in the south end of Rosebud County. The high school children in Birney School District No.3 have to be boarded out to go to high school, most of them go out of county or state.

C On page II-67, on the Birney community, the school board actualy has only one rancher on it, the other two are blue collar workers living in town.

Elmer Fjell Jr.
Birney, Montana
59012

A Thank you for commenting.

B Comment noted. Thank you.

C Thank you for your comment. As of January, 1984, none of the school board members are ranchers. See change in text.

LETTER 60

RECEIVED
JUL 8 1982
STATE LANDS

July 7,1982
Rt. 1, Box 160
Trout Creek,Mt.59874

Mr.Gareth Moon
Commissioner of State Land
Capitol Station
Helena,Mt. 59620

Dear Mr.Moon:

I am writing in regards to the Montco Draft Environmental Impact Statement. I would like to commend you and your staff on this Impact Statement.

I lived for some time in the Ashland area and ranched the land. I have since moved to Trout Creek, Montana. During the years I ranched on Tongue River near the Montco proposed mine the grass production was not very good at times. I have driven by several of the mines in the area such as Colstrip and Decker. It looks to me that the reclaimed land is as or more productive than before mining.

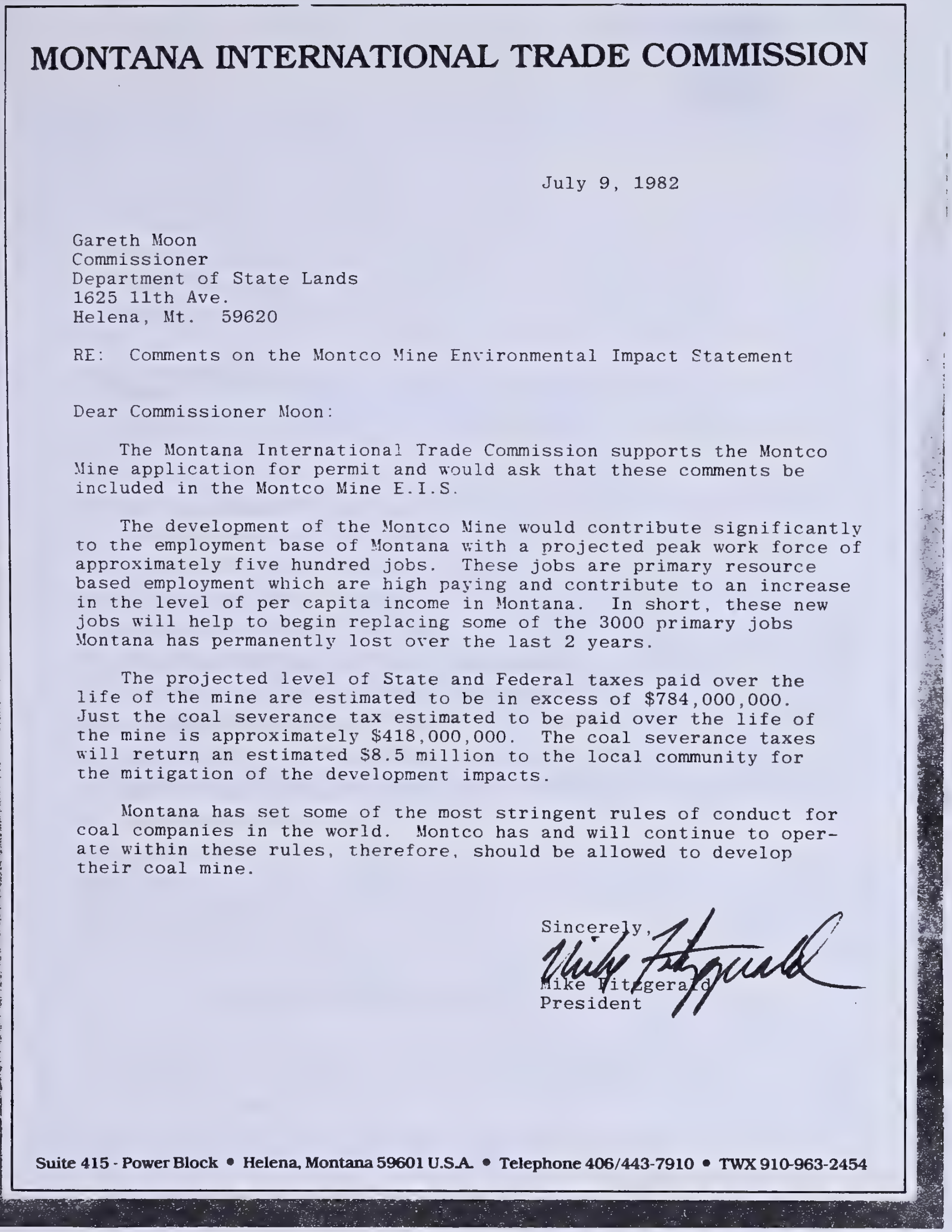
The growth in business and services in the Ashland area would also be a benefit to people living in the area.

Thank you for considering my comments.

Sincerely,
Herbert T. Wagner
Herbert T.Wagner

Thank you for commenting.

LETTER 61



MONTANA INTERNATIONAL TRADE COMMISSION

July 9, 1982

Gareth Moon
Commissioner
Department of State Lands
1625 11th Ave.
Helena, Mt. 59620

RE: Comments on the Montco Mine Environmental Impact Statement

Dear Commissioner Moon:

The Montana International Trade Commission supports the Montco Mine application for permit and would ask that these comments be included in the Montco Mine E.I.S.

The development of the Montco Mine would contribute significantly to the employment base of Montana with a projected peak work force of approximately five hundred jobs. These jobs are primary resource based employment which are high paying and contribute to an increase in the level of per capita income in Montana. In short, these new jobs will help to begin replacing some of the 3000 primary jobs Montana has permanently lost over the last 2 years.

The projected level of State and Federal taxes paid over the life of the mine are estimated to be in excess of $784,000,000. Just the coal severance tax estimated to be paid over the life of the mine is approximately $418,000,000. The coal severance taxes will return an estimated $8.5 million to the local community for the mitigation of the development impacts.

Montana has set some of the most stringent rules of conduct for coal companies in the world. Montco has and will continue to operate within these rules, therefore, should be allowed to develop their coal mine.

Sincerely,

Mike Fitzgerald
President

Suite 415 - Power Block • Helena, Montana 59601 U.S.A. • Telephone 406/443-7910 • TWX 910-963-2454

Thank you for commenting.

LETTER 62

THE WILDERNESS SOCIETY
Northern Rockies Regional Office
107 West Lawrence, P. O. Box 1184, Helena, Montana 59601 (406)443-7350

July 8, 1982

COMMENTS ON PROPOSED MONTCO MINE, ROSEBUD COUNTY, MONTANA

RECEIVED
JUL 1 3 1982
STATE LANDS

Gareth Moon, Commissioner
Montana Department of State Lands
1623 11th Ave.
Helena, MT 59601

Dear Commissioner Moon:

The proposed Montco Mine will be adjacent to the Custer National Forest and within the Custer National Forest is the 16,000 acre Tongue River Breaks Wilderness Study Area. The Tongue River Breaks encompasses an area of short pine Savanah that is not found elsewhere in the National Wilderness System. This area, also categorized as an eastern ponderosa pine ecosystem, unique for eastern Montana, is a valuable recreation area and offers opportunities for solitude. Furthermore, the Montco Mine Life of Mine Plan adjoins the proposed Tongue River Breaks Contiguity Area (Montco has expressed interest in this area for the proposed 1984 Federal Lease Sale). The effects of this mine proposal on these areas of exceptional opportunity for solitude and unique ecosystems would be devasting. We request that the Department of State Lands exercise its authority under Sec. 82-4-227(2)(d) which states that they shall deny a permit when "mining on that area would adversely effect the use, enjoyment, or fundamental characteristics of neighboring land having special, exceptional, critical or unique characteristics."

We thank you for the opportunity to comment.

Sincerely,

Bill Cunningham
Bill Cunningham
Regional Representative

BC:dw
cc: Governor Ted Schwinden

"In wildness is the preservation of the world." - Thoreau

Your comments are noted. Thank you.

LETTER 63

RECEIVED
JUL 8 1982
STATE LANDS

July 5, 1982

Mr. Gareth Moon
Commissioner of State Lands
Capitol Station
Helena, MT. 59620

Dear Mr. Moon:

I own and operate a buisness in Ashland. I am writing this letter in regard to the Montco mine which is being developed south of Ashland. I understand that your office held a hearing on the mine in Ashland sometime ago. I did not attend the meeting but would like to make the following statements.

The opening of a mine would be a benefit to this town. There is a high unemployment rate in the area now. This has an effect on my buisness as well as others in Ashland. The mill and Coal Creek mine have closed and caused several people to lose their jobs. If some type of buisness or development does not occur these people will probably be forced to move, this would cause buisness to drop even more. The growth which would happen as a result of the opening of a mine would improve the situation.

I would support the permitting of the mine as many others would.

Thank-you for considering my comments.

Sincerely,

Thank you for commenting.

LETTER 64

July 8, 1982

RECEIVED
JUL 13 1982
STATE LANDS

Gareth Moon
Commissioner
Montana Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59620

Dear Commissioner Moon:

The Powder River Protective Association (PRPA) appreciates this opportunity to comment on the Draft Environmental Impact Statement (DEIS) on the proposed Montco Mine. PRPA is a group of ranchers, farmers, and other citizens concerned about the effects of energy industrialization on agriculture and local communities in Powder River County. PRPA is an affiliate of the Northern Plains Resource Council.

A PRPA is chiefly concerned by the lack of discussion in the DEIS of the possibility of a premature "bust" at the proposed mine or the projected mines in the cumulative scenario, and the community service and fiscal impacts of such a bust on Powder River County. The DEIS assumes a smooth scale-up of mining activity, and a gradual decline as the coal runs out--a situation that is unlikely to occur in real life. In fact, recent energy and mineral development crashes in Butte and Anaconda, Idaho, and on the Western Slope of Colorado, provide examples which directly contradict the assumptions in the DEIS. The effect of a similar bust in Southeastern Montana would be to greatly increase the potential fiscal and community service problems which the DEIS projects for local communities, including those in Powder River County.

In light of the economics of the proposed and projected mines--marginal, at best--such a scenario is not unlikely. PRPA suggests that an additional scenario, involving the impacts of mine shutdowns prior to the end of the planned mine life, be evaluated in a supplement to the DEIS.

A The variations in timing and magnitude of an early shutdown are complex. Appendix 9 has been written to discuss some of the possibilities of early closure, either partial or total.

B PRPA is also concerned that little analysis of the social and fiscal impacts at the end of mining (in whatever

B See appendix 9.

LETTER 64

Mr. Gareth Moon
page two
July 8, 1982

timeframe) is to be found in the DEIS. In light of the recent examples available for study, it would seem reasonable to include a discussion of the impacts of shutdown.

C Finally, although the DEIS suggests several possible measures that could be taken to mitigate projected social and fiscal impacts, there are no concrete recommendations (much less guarantees) that any such steps be taken by either industry or government. PRPA suggests that specific steps required of Montco be agreed to, and that guarantees be made by state government to assist local communities, before a permit to mine is granted.

C See letter 9, answer A.

These comments should not be taken as a conditional approval by PRPA of permitting the Montco mine. PRPA supports the position of other NPRC members and affiliates concerning the Montco mine proposal. These comments will be restricted to discussion of the impact of the mine on the Broadus area in Powder River County.

SPECIFIC COMMENTS

D Summary: The summary mentions serious problems in community services and fiscal impacts in Broadus as a result of mining (p. iv). In light of this, it would seem logical to condition any mining permit on mitigation of these impacts.

D Comment noted.

E Chapter II, Existing Environment
II-62: The DEIS predicts that 906 persons would leave Powder River County for employment reasons by the year 2010, without mining. The basis for this statement is unclear, and we think the statement is questionable. It is apparently premised on a projected decline in agricultural and oil industry employment in Powder River County which may not occur, at least to the degree predicted in the DEIS.

E Any population projection model makes assumptions about future employment patterns. The assumptions used in the Mountain West model were reviewed by several professionals and found to be reasonable and similar to those used in other available models. The assumptions were based on historical trends and an anticipation of industrial changes. Population projections usually lose accuracy the further into the future they are taken. They should be viewed as an educated estimate, based on what we know now.

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July 8, 1982

F Chapter III, Impacts of the Proposal

Discussions of the impacts of mining on Powder River County throughout this chapter suggest that the impacts of the Montco Mine alone would be greater than the impacts of several mines taken together. While it is understood that the basis for this is that the Montco Mine would be located and pay taxes in Rosebud County, and several of the mines in the cumulative scenario would be in Powder River County, the suggestion is unwarranted for a number of reasons.

First, the cumulative scenario ignores the impacts of the construction of one or more synthetic fuels facilities which would be associated with the projected mines. The impacts of even one such facility on community services and fiscal situations in Powder River County would outweigh the impacts of the mines in the cumulative scenario.

Second, the suggestion is based on an assumption of a smooth, phased build-up followed by a gradual decline in mining, which is highly unlikely (as discussed previously).

Third, the idea that development and growth of the scale projected (a more than doubling of Powder River County's population) could somehow "pay for itself" through property and other taxes flies in the face of previous experience in rapidly growing communities. In the absence of specific budget projections in the DEIS, it is probably unwise to project a net gain to local government fiscal balances from the cumulative scenario.

A more likely scenario than the smooth scale-up and scale-down projected in the DEIS would involve a more rapid build-up and frequent, major disruptions in construction and operation employment at projected mines. Such a scenario would more closely fit the pattern of existing mines in the Powder

F No synthetic fuels plant has been mentioned in any long-range plan filed with the Montana Department of Natural Resources. The cumulative coal production scenario was based on a projection of conventional power plant construction in Montana's coal market area. The Department agrees that in the event that a synthetics fuel plant were constructed in the Montco vicinity, that its impacts would far outweigh the impacts of the mines in the cumulative scenario. However, given the great uncertainties associated with the synthetic fuels industry, such as those mentioned elsewhere in the comments, no meaningful information would be available at this time.

Figures III-6 through III-9 illustrate that in fact the cumulative scenario is not characterized by a smooth, phased build-up.

In Montana, the previous experience is that energy development has not only paid for itself, but in fact has kept county tax rates where development occurs the lowest in the state. Please see the discussion on page II-76 of the draft EIS.

Specific budget projections were prepared for the draft EIS (Mountain West Research Inc., 1981). As is stated on page III-71 these projections document the conclusions reported in the draft EIS. The report is on file at the Department's offices in Helena, where it may be referred to by those persons interested in greater detail. The draft EIS points out that the taxable value associated with the cumulative scenario would eventually make up for the decline associated with the falling oil production. The draft also explains that in the event that the Montco Mine alone opens, there would be revenue shortfalls in Powder River County jurisdictions.

LETTER 64

Mr. Gareth Moon
page four
July 8, 1982

Powder River Basin, and of energy and mining development in the West generally.

This chapter should include a discussion of the impacts of the inevitable bust, including the impacts on local government, unemployment, sociology, etc.

Table III-8

G The table shows an unlikely percentage of Montco workers residing in Colstrip. A change in either the Colstrip or Montco construction schedules from the convenient fit assumed in the DEIS could make it impossible for so many Montco workers to live in Colstrip. Further, it may well be that many workers will find Broadus a more desirable place to live than Colstrip, and Broadus would receive a correspondingly greater influx than projected in the DEIS.

H Local planners and Montco have previously mentioned the possibility of company buses from Broadus to the mine as one means of handling the housing and transportation problems posed by the remote location of the mine. Why wasn't this possibility analyzed in the DEIS?

I III-58: Regarding inflation in boomtown communities, the DEIS states that "it is not known if prices would rise more than elsewhere in the region or the nation." It is regrettable that the DEIS did not explore this issue sufficiently in order to arrive at an answer to the question, since "mineflation" is one of the most important social impacts of mining in rural communities. In addition to the long history of rapid price rises in Western boomtowns, the DEIS might have analyzed price increases over the past several years in Sheridan, Wyoming and Gillette, in comparison with prices in (for example) Broadus or Miles City.

G See letter 48, answers EEE and FFF.

H The possibility of providing a bus for commuting workers was introduced as a mitigating measure in chapter IV of the draft EIS. The EIS is designed to analyze a proposed action, as presented to the Department in a mine plan. Since the provision of a bus was not part of the mine plan, the Department did not analyze the possibility as an impact (positive or negative).

I Unfortunately, local price information for Miles City and Broadus is not available. For Sheridan, however, recent research has shown that, while firm conclusions cannot be drawn about the specific effects of energy development on consumer prices, the data generally do not support the conslusion that development substantially increases inflation in areas other than housing.

LETTER 64

Mr. Gareth Moon
page five
July 8, 1982

J III-61: The DEIS speculates that increased rates of disorders such as child abuse in boomtowns may be only the result of better recordkeeping, and not reflective of an actual increase in incident rates. Such speculation without some sort of factual basis (i.e. comparison of rates of incidence before and after a new recordkeeping practice is adopted) is unwarranted. Documentation of increased social problems associated with rapid growth is extensive and convincing, and should not be minimized.

K III-73: The DEIS projects that Powder River County tax rates will more than double as a result of the proposed mining activity in Rosebud County, but that the situation would be less serious under the cumulative mining scenario. As stated above, we think this projection is unduly rosy. What, exactly, would be the effect on mill levies of the cumulative scenario?

L III-75: The DEIS land use discussion projects that 120 acres near Broadus would be converted to urban uses under the cumulative scenario. This would appear to greatly understate the land use impact from doubling Powder River's population (and hence retail trade and government services) and from increasing the population and housing requirements of Broadus by over 50%. Is the projection based on a massive shift of public opinion in Broadus in favor of strict land use controls? Does the 120 acre figure include requirements for housing, recreation, retail stores, or government service lands (dumps, water storage, etc)?

Chapter IV, Alternatives

M Chapter IV contains a list of many suggestions for "stipulations or mitigating measures" to accompany permit approval. It is unclear whether the DEIS is suggesting that the potential mitigating measures could be made conditions on any permit. In

J Please see letter 21, answer C, and letter 48, answer BBB.

K County tax rates are the result of a series of local decisions and so precise projections are necessarily subject to a great deal of uncertainty. With that in mind, the detailed modeling done for the EIS (Mountain West Research Inc., 1981) projects that in the cumulative scenario the tax rate in Powder River County would begin to increase above the current level (30.77 mills) in 1992. The greatest increase would occur in 1995 and would amount to 18.1 mills. The county mill levy would then decrease steadily, falling below the current level in 2006.

L The estimate is based on the existing relationship between population and urban land uses. Urban land uses include housing, public facilities, and the commercial/industrial development associated with population change.

M The Department would decide during the permit decision what stipulations would be attached to the permit. All mitigating measures listed cannot be made conditions of the permit, since some are beyond the authority of the

LETTER 64

Mr. Gareth Moon
page six
July 8, 1982

any case, PRPA strongly suggests that this be done, especially in regard to mitigating social and fiscal impacts.

N For many of the mitigating measures listed, it is unclear whether Montco or a government agency would be responsible for taking the necessary actions. Further, the specific government agencies which might mitigate given impacts are not, but should be, listed in the DEIS.

O To our knowledge, Montco has taken little interest in adopting any of the mitigating measures proposed in the DEIS. What do the authors of the DEIS estimate are the chances of any or all of the proposed measures being taken by Montco or any government agency?

Once again, PRPA would like to express its appreciation for the opportunity to comment on the Draft Environmental Impact Statement. If you have any questions regarding these comments, or if we can be of any other assistance to you, please do not hesitate to contact us.

Sincerely,

Walter Archer

Walter Archer
President, Powder River
Protective Association

Department. An example is the suggestion that local jurisdictions establish joint powers to allow sharing of tax revenues.

N The Department does not have the authority to say what other agencies would do. What Montco would be required to do by the Department would not be known until the permit decision.

O Montco would be required to comply with all mitigating measures attached to the permit as stipulations. We do not know what the chances are that Montco or some public agency would take measures beyond those in the permit.

LETTER 65

STATE OF MONTANA

DEPARTMENT OF
FISH AND GAME

1420 East Sixth Avenue
Helena, Montana 59620

July 14, 1982

Mr. Brace Hayden, Administrator
Reclamation Division
Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59620

RECEIVED
JUL 15 1982
STATE LANDS

RE: Montco EIS

Dear Brace:

The following are some comments on the hydrology and aquatic sections of the Montco EIS.

A Montco's section on dissolved solids in the Tongue River on page III-15 assumes that increases would be immeasurably small, even under the "worst case" scenario. There are no data presented to show what increases are expected or what the TDS of the Tongue River would be following mining. The Tongue River, Montana, Petition Evaluation Document prepared by DSL/OSM showed a post-mining range of 1,687 to 2,506 mg/l TDS for the Tongue River. These levels present a very high salinity hazard for irrigation and could be expected to have a strong influence on the aquatic community as well. I understand the DSL/OSM document dealt with a more intensive mining proposal than the MONTCO EIS, but I do think this problem is important and should be addressed.

B On page III-17, paragraph 2, the EIS states, "predicted Tongue River water quality changes due to mining by Montco and elsewhere in the Tongue River drainage should have no effect on present water uses in the area." This is in conflict with the predictions made by the DSL/OSM document which suggests drastic increases in TDS under low flow conditions. Several factors should be considered, i.e., increased agricultural development, impacts of new Tongue River Dam, level of mining, before stating Montco will not have an impact.

Thank you for the opportunity to comment.

Sincerely,

James A. Posewitz
Administrator
Ecological Services Division

JAP/sk

A The estimate of expected increases in dissolved solids concentrations in the Tongue River presented in Montco's permit application (vol. 5, chap. 2, Protection of the Hydrologic Balance Plan, pp. V-2-56-58) assumes that degraded spoil ground water would become diluted as it contributes to Tongue River surface flow. Montco assumed a "worst case" spoil ground water dissolved solids concentration of 10,000 mg/ l, a low flow discharge of 179 cfs, and Tongue River water dissolved solids concentration of 814 mg/l. Use of these extremely conservative constants provides probable worst case results. Montco (vol. 5, chap. 2, p. V-2-58) calculates an increase of 0.1 mg/l dissolved solids in Tongue River water, which is statistically meaningless, and would have no impact on current water uses or users.

The alternative method of predicting postmining dissolved solids loads in the Tongue River given in the draft (number 2, p. III-15) is also discussed in appendix 5. This is in contrast to the erroneous reference to appendix 7 given in the draft text.

The postmining range of Tongue River dissolved solids concentrations quoted in the comment is apparently taken from the draft petition evaluation document (DSL and OSM, 1981, p. IV-7). Cited values are for Tongue River alluvial ground water, not stream flow. These estimates are based upon the apparent assumption of coal mining on both sides of the Tongue River upstream from Cook Creek and along the east side of the Tongue River between Cook Creek and opposite the northern boundary of the Northern Cheyenne Indian Reservation (DSL and OSM, 1981, app. D). The estimate of total mining disturbance along the Tongue River far exceeds that amount proposd by Montco at this time, or in its life-of-mine plan.

Additional estimates of expected increases in dissolved solids concentrates in Tongue River water under various development assumptions were developed for the final EIS. These estimates are presented in table III-3. They indicate that proposed mining by Montco in the North King mining unit, and in the life-of-mine area, would have no measurable impacts on Tongue River water quality.

B We are not sure what part of the Tongue River Petition Evaluation Document (DSL and OSM, 1982) you are referring to. DSL and OSM (1982, pp. II-12-15) use at least five different scenarios in the evaluation of development impacts on Tongue River water quality. These scenarios assume varying industrial and municipal water withdrawals, irrigated acreages, and mining developments in the Tongue River Valley below the Tongue River Dam. Please refer to the petition evaluation document for specific assumptions for each scenario.

It is true that significant increases in dissolved solids concentrations in Tongue River low flows result from modeling; however, all development scenarios include more mining than Montco proposes. Montco's impacts, including cumulative water quality impacts of numerous proposed and existing mines above the Tongue River Dam, are probably significantly less than any of the scenarios modeled in the petition evaluation document. In this light, it is pointed out that scenario 4 in the petition document (p. II-12), results (DSL and OSM, 1982, table II-5) in predicted dissolved solids concentrations (table II-5) not appreciably different from today's conditions. The petition evaluation also suggests (p. II-15) that increased irrigation in the Tongue River valley may contribute more to future water quality concerns than will limited mining.

Your concerns regarding additional development (i.e. increased agricultural developments, impacts of the new Tongue River Dam, level of mining) are addressed in the petition evaluation. Additional computer simulations were run for this final EIS to predict dissolved solids concentrations in the Tongue River under various development assumptions. The EIS predictions are reported in table III-3.

LETTER 66

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MONTCO

11-2-005

RECEIVED
JUL 6 1982
STATE LANDS

July 6, 1982

Mr. Gareth Moon, Commissioner
Montana Department of State Lands
State of Montana
1625 Eleventh Avenue
Helena, MT. 59620

Dear Commissioner Moon:

We have reviewed the May 5, 1982 Draft Environmental Impact Statement for the proposed Montco Mine in Rosebud County, Montana. While we do not agree with all of the contents of the DEIS, we find it to be well organized and written. Montco respectfully submits the attached comments regarding the DEIS.

The attached comments clarify certain points in the DEIS that may well be misunderstood and/or misinterpreted. Montco believes that complete understanding of the mining and reclamation plans is essential for proper evaluation of the proposed project in an EIS.

Thank you for your consideration of Montco's comments concerning the DEIS.

Sincerely,

Lanny K. Icenogle

L.K. Icenogle
Project Manager

LKI:lw

Enclosure

LETTER 66

A Section Affected: SUMMARY

Summary of Impacts
Soils

Page: iii

Quotation from DEIS:

Soils. Some impacts on soils would be unavoidable, including loss of soil profile, structure, and organic matter. These impacts would make the area more sensitive to mismanagement and drought than prior to disturbance. In addition, the proposed plan calls for salvage of some unfavorable soils, and this could hamper revegetation in isolated areas.

Comment:

1. The DEIS should note that there is potential for mitigating some unfavorable soil characteristics by mixing during stockpiling and transport. The DEIS statement should be placed in the context that the objective of the two-lift salvage method is to re-construct, as much as practical, the soil characteristics which support the existing native plant community. The DEIS failed to acknowledge the mitigative effects of low smectite levels in the soil, the presence of an existing native plant community on these materials, and the fact that Montana regulations require adequate revegetation.

A We agree that the the two-lift salvage method and mixing during handling would help reclamation. Even so, some impacts are unavoidable (at Montco or at any other mine) whenever the soil is removed, handled, or stockpiled.

We did not acknowledge the "low smectite levels" because the clay mineralogy data submitted by Montco is flawed. The consistent and relatively abundant occurrence of quartz and feldspar in the data reported for the soil samples suggests that the analysis was not conducted on the clay fraction only, but on each of the samples in bulk. Because of this and because of the interference in the x-ray diffraction diagrams caused by the presence of quartz and feldspar, no quantitative conclusions can be made. Even so, the data do show that smectite is present in all samples.

The native plant community would help in revegetation; however, if Montco salvages unfavorable subsoil material, of which some ends up closer to the surface after redistribution, poor vegetative growth in isolated areas could result. Montana regulations alone would not mitigate unavoidable impacts, although Montco would be required to repair areas where revegetation is inadequate.

LETTER 66

B Section Affected: SUMMARY

Summary of Impacts
Vegetation

Page: iii

Quotation from DEIS:

Because of the potential problems with soils and overburden, revegetation failures could occur in areas up to several acres in size.

Comment:

2. Reclamation planning efforts do not indicate that revegetation failures will occur in areas up to several acres in size. Isolated small areas not reclaimed to potential would not have a significant effect on overall productivity. Regardless, Montco has committed to a monitoring and maintenance program which will correct potential problems (as outlined in Montco's Reclamation Plan) using revegetation techniques proven in Montana and other areas of similar conditions. Such techniques are flexible enough to address problem areas where they occur and will be implemented.

B Based on Montco's revised permit application, we agree that revegetation failures are unlikely in areas up to several acres in size. However, due to the small chance of error in Montco's overburden handling plans, some unknown amount of unfavorable material could still end up in the rootzone. (See chapter III, Geology, Overburden.) Small, localized areas of low-quality or sparse vegetation could result.

LETTER 66

(Section Affected:	SUMMARY Summary of Impacts Wildlife
Page:	iv
Quotation from DEIS	Habitat-type changes would result over the long-term (100 years or more) in a loss of ponderosa pine cover for big-game species.
Comment:	3. The discussion on page III-24 of the DEIS clearly indicates that mining and reclamation will result in a long-term change of composition of ponderosa pine cover. The ponderosa pine habitat to be disturbed will be reclaimed with the long-term goal of habitat similar to premining conditions.

(See the revised summary and revised text in chapter III, Vegetation. It would take decades to reestablish trees big enough to provide wildlife cover.

LETTER 66

D Section Affected: SUMMARY

Summary of Impacts
Air Quality

Page: iv

Quotation from DEIS: Total suspended particulate (TSP) concentrations would increase significantly in Ashland and near the proposed permit area.

Comment: 4. No air quality modeling was conducted to assess the magnitude of the TSP impacts from road FAS 566; therefore, the above statement is based on conjecture and may be misleading as to the "significance" of the impacts. The sentence should be clarified to read:

Total suspended particulate (TSP) concentrations would exhibit measurable increases near the proposed permit area.

D SAI (1981) modeled the maximum increase in annual average TSP concentrations off the mine site. The maximum annual average predicted was 55.2 ug/m^3. Since the baseline concentrations average 23.2 ug/m^3, mining would increase TSP concentrations by up to 138 percent. Although below both MAAQS and NAAQS, a 138 percent increase is significant.

The only major source of particulate in Ashland is motor vehicle traffic, especially on unpaved roads, and the annual average TSP concentration during August, 1979, through July, 1980, was 95.0 ug/m^3, exceeding both MAAQS and NAAQS. Montco did not model the impacts to air quality at Ashland. However, the estimated increase of 330 light duty vehicles and 10 heavy duty vehicles, almost all of which would travel through Ashland to the minesite twice daily, would significantly increase particulate emissions. The statement in the EIS is based on the fact that TSP concentrations stem from particulate emissions. A large increase in emissions would cause an increase in TSP concentrations.

LETTER 66

E Section Affected: SUMMARY

Summary of Impacts
Sociology

E Note text change.

Page: iv

Quotation from DEIS:

The population of the Ashland area near the proposed mine would increase as much as 83 percent during mine operations. This population influx would, over time, result in changes to the social organization of the Ashland-Birney area.

Comment:

5. These two sentences should be clarified to read:

The population of the Ashland area near the proposed mine might increase as much as 83 percent during mine operations. This population influx may, over time, result in changes to the social organization of the Ashland-Birney area.

LETTER 66

F Section Affected:	I. DESCRIPTION OF MONTCO'S PROPOSAL A. Scope of Analysis C. Agency Responsibility
Page:	I-3, I-13 and I-14.
Quotation from DEIS:	Figures I-2, I-6 and I-7 incorrectly state the distance of the Montco Mine Plan Area to the communities of Ashland and Birney.
Comment:	6. These distances should be corrected to approximately 7.5 and 8 miles respectively.

F The distances have been revised. (See also letter 1, comment B.)

LETTER 66

G Section Affected: I. DESCRIPTION OF MONTCO'S PROPOSAL

B. Mining and Reclamation Plans
   3. Coal in the North King Mining Unit

Page: I-11

Quotation from DEIS:

The McKelvey splits into three seams, the MLV, ML1, and **LF1**, in the southern part of the unit.

Comment:

7. The LF1 seam is not a split off the McKelvey seam. It is a stray seam found above the Flowers-Goodale seam.

The paragraph should read:

Montco plans to mine the two major coal seams and one minor coal seam that underlie the North King mining unit, the Middle Knobloch (MK), the McKelvey (MLV) and the Local Flowers 1 (LF1). The McKelvey splits into two seams, the MLV and ML1 in the southern part of the unit.

G Thank you for correcting us. Note that the draft simply quoted Montco's permit application (vol. 2, p. III-I-4). Figure III-3 in the application shows the seams correctly.

LETTER 66

H Section Affected: I. DESCRIPTION OF MONTCO'S PROPOSAL

B. Mining and Reclamation Plans
  3. Coal in the North King Mining Unit

Page: I-11

Quotation from DEIS: Table I-3 incorrectly labels the LF1 seam.

Comment: 8. The LF1 seam should be correctly labeled the Local Flowers 1 (LF1).

H The table has been revised.

LETTER 66

Section Affected:	I.	DESCRIPTION OF MONTCO'S PROPOSAL B. Mining and Reclamation Plans 3. Coal in the North King Mining Unit	Thank you for clarifying this.
Page:	I-11		
Quotation from DEIS:		The coal to mined in the NKMU would average as received at the power plant 8655 BTU. . . .	
Comment:	9.	The BTU listed above is the value at which the laboratory received the coal sample. The value at which the coal reaches the power plant would be 9026 BTU's calculated on an equilibrium moisture basis.	

LETTER 66

J Section Affected:	II. DESCRIPTION OF THE EXISTING ENVIRONMENT A. Geology 3. Topography and Geomorphology a. North King mining unit	J	Comment noted.
Page:	II-1		
Quotation from DEIS:	Associated topsoil stockpiles and mining facilities are located south of King Creek and along the Tongue River.		
Comment:	10. This statement should be clarified to read: Associated topsoil stockpiles and mining facilities are located south of King Creek and east of the relocated county road.		

LETTER 66

K Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
   3. Topography and Geomorphology
      a. North King mining unit

K Comment noted.

Page: II-1

Quotation from DEIS:

Visual observations suggest that erosion is probably moderate to moderately severe over the North King unit. Vegetation cover is sparse, and pedestalling of grasses was observed in the field.

Comment:

11. Vegetation cover of the NKMU is not substantially different than other areas in southeastern Montana. Cover is related to community type and can be considered sparse only for certain types such as breaks. If the visual observations were made in 1979 or 1980, the area probably appeared worse than it actually is due to the drought conditions of those years. Monitoring during 1981 (a normal precipitation year) did not indicate especially sparse cover for most types nor significant pedestalling of grasses. Range trend was stable over the majority of of the area indicating that pedestalling is not a significant problem. Erosion potential is probably variable depending on community type and other factors.

LETTER 66

Section Affected: DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
   3. Topography and Geomorphology
      b. Mine plan area

Page: II-3

Quotation from DEIS: The mine plan area stretches approximately 12 miles southwestward from the North King unit along the eastern margin of the Tongue River to just south of Birney Day Village on the Northern Cheyenne Indian Reservation (fig. II-2).

Comment: 12. This statement should be clarified to read:

The mine plan area stretches approximately 12 miles southwestward from the North King unit along the eastern margin of the Tongue River and east of the river near Birney Day Village (located on the Northern Cheyenne Indian Reservation).

Comment noted.

LETTER 66

M Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
   4. Stratigraphy and Structure

M Note text changes.

Page: II-5

Quotation from DEIS:

Within the North King Unit, only the Middle Knobloch and McKelvey seams are present and targeted for mining.

Comment: 13. This statement should read:

Within the North King Unit, only the Middle Knobloch, McKelvey and LF1 seams are present and targeted for mining.

LETTER 66

N Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
5. Coal Resources

N Comment noted. See text changes.

Page: II-5

Quotation from DEIS:

.... as part of two major coal seams: the Middle Knobloch (MK) and the McKelvey (MLV) (Fig. II-3). The McKelvey seams splits to the south to form the MLV, ML1 and LF1.

Comment:

14. This statement should read:

.... as part of two major and one minor coal seams: the Middle Knobloch (MK), the McKelvey (MLV) and the Local Flowers 1 (LF1) (Fig. II-3). The McKelvey seam splits to the south to form the MLV and ML1.

LETTER 66

Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
   6. Overburden
      a. Montco project area overview

We agree. The text has been changed.

Page: II-5

Quotation from DEIS: On the average, the overburden has a pH of 7.8, is moderately saline, and is generally sodic.

Comment: 15. The words often sodic should be used instead of generally sodic. On the the average, only a little over half the overburden is expected to be sodic. The term "generally" implies that a sodic problem is almost always present.

LETTER 66

P Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
  6. Overburden
    a. Montco project area overview

P We agree. The text has been changed.

Page: II-7

Quotation from DEIS:

"Favorable rootzone material" means overburden that does not significantly exceed DSL suspect levels for trace elements and texture, and would have an electrical conductivity (EC-a measure of salinity) value of less than four mmhos/cm and a sodium absorption ration (SAR-a measure of sodicity) of less than twelve.

"Moderately favorable rootzone material" means overburden that does not significantly exceed DSL suspect levels for trace elements and texture, but would have EC values greater than 12 and less than or equal to 20. Such material would be considered for use in rootzone reclamation only if sufficient amounts of favorable material was not available and if the clay content were less than 40 percent and the clay mineralogy was dominated by nonswelling clays, such as kaolinite and illite.

"Unfavorable rootzone material" means overburden with EC values greater than eight mmhos/cm and/or SAR values greater than 20; it may significantly exceed DSL levels for certain trace elements and texture.

Comment:

16. The use of the terms "significant" and "insignificant" in the DEIS text are misused in reference to trace metals. In scientific writing (and this DEIS falls into that category), it is improper to say a number is significantly different (i.e. larger or smaller) when the evaluation is based on judgement rather than experimentation. In biological systems the term "significant" is used only when stating a result with 90% or even 95% confidence. This high degree of confidence is developed through replicated experimentation.

When the DEIS indicates, for example, Ni at 4 ppm significantly exceeds the 1 ppm suspect level, it implies this difference is for certain meaningful, and clearly suggests plant life will suffer. The state of knowledge regarding Mo and Ni toxicity on grasses, forbs and schrubs is not adequate to make such statements with any degree of certainty. In the mine permit application, the text of Appendix N (Overburden Analysis) does not have terms like "significant" or "insignificant" when discussing overburden quality for the above stated reason.

In addition, the term "absorption" should read "adsorption".

LETTER 66

Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
   6. Overburden
      b. Proposed permit area--North King Mining unit

Page: II-8

Quotation from DEIS: The second set of core samples, associated with existing coal beds, are generally saline and/or sodic.

Comment: 17. The word _often_ should be used instead of _generally_. As previously discussed, the term "generally" implies that a problem is almost always present.

We agree. The text has been changed.

LETTER 66

R Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
   6. Overburden
      b. Proposed permit area -- North King Mining unit

R We agree. See text changes.

Page: II-8

Quotation from DEIS:

Of the trace elements, selenium, copper, cadmium, lead, manganese, mercury, and zinc rarely exceed DSL suspect levels. Molybdenum and boron often exceed levels, but by very small, often insignificant, amounts. Nickel, however, significantly exceeds the suspect level in more than half the samples analyzed.

Comment: 18. The use of the terms "insignificant" and "significantly" should be deleted for the reasons previously discussed in these comments. (p. 16-17 comment 16).

LETTER 66

S Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
   6. Overburden
      c. General description of remaining project area mining units
         1) through 4)

S We agree. See text changes.

Page: II-12

Quotation from DEIS

... nickel by significant amounts about a third of the time.

... and nickel often exceeds the suspect level by significant amounts.

Of most importance, nickel significantly exceeded the suspect level in 63% of the core lengths drilled. The remaining trace elements rarely exceeded the suspect levels.

Of the trace elements, both molybdenum and nickel significantly exceed the DSL suspect levels about a third of the time. Lead significantly exceeds the level about 10% of the time. Rarely do the remaining trace elements exceed the levels.

Comment: 19. The use of the terms "significant" and "significantly" should be deleted for the reasons previously discussed in these comments.
(p. 16-17 comment 16).

LETTER 66

T Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Geology
   6. Overburden
      c. General description of remaining project area mining units
         4) South Gate mining unit

Page: II-12

Quotation from DEIS: Lead significantly exceeds the level about 10% of the time.

Comment: 20. It should be clarified that many of the overburden samples taken before 1979 may have been contaminated with pipe joint compound containing lead. When vaseline was subsequently used as pipe joint lubricant, no suspect lead levels were observed.

T Comment noted. The text has been changed.

LETTER 66

Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

B. Hydrology
   1. Summary

Page: II-13

Quotation from DEIS:

In the vicinity of the North King unit, King Creek alluvium drains northward to the Middle Knobloch and McKelvey coal seams and associated clinker areas. Accordingly, King Creek alluvium is dry or nearly dry.

Comment:

21. These sentences should read:

In the vicinity of the North King Unit, King Creek alluvium drains northwestward toward the Tongue River, though minor recharge to the McKelvey coal seam occurs along a short reach of King Creek on a seasonal basis. The water content of King Creek alluvium is dependent upon seasonal recharge as indicated by local dryness of the alluvium. Where subcrops of Knobloch and McKelvey coal contact King Creek alluvium, recharge and discharge relationships also vary according to seasonal fluctuations and climatic variations.

The second sentence quoted above should be deleted.

Your analysis is noted. Observation wells completed in alluvium within several miles of the mouth of King Creek have been consistently dry for the period of record. Middle Knobloch and McKelvey coal seams subcrop in the upper reaches of the King Creek drainage, acting to recharge the alluvial system at that point. Alluvial ground water is soon lost, as it moves downgradient to Middle Knobloch-McKelvey clinker, paralleling the north side of the drainage. This phenomenon is evidenced by analysis of water level elevations of wells completed in the alluvium and clinker. There is a definable gradient to the north from the King Creek alluvium to the Middle Knobloch-McKelvey clinker, indicating alluvial recharge to the clinker. Alluvial ground water is thus "captured" near the contact with the clinker, resulting in dry wells downgradient in the King Creek alluvium.

LETTER 66

V Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

B. Hydrology
  2. Surface Water

Page: II-14

Quotation from DEIS:

Montco's current plan ultimately calls for mining disturbance and facilities for approximately 10,171 acres, or 0.5 percent of the Tongue River drainage above the mine plan area.

Comment: 22. This statement should read:

Montco's current plan ultimately calls for mining disturbance and facilities for approximately 5,570 acres, or 0.3 percent of the Tongue River drainage above the mine plan area. (See pg. iii, ¶ 2 of the DEIS).

V The mine plan area covers 10,171 acres, which would comprise mining-, facilities-, and associated-level disturbance (Montco application, vol. 8, chap. 6, p. VI-1-1). Although 5,570 acres would be disturbed by mining, roads, stockpiles, and facilities, the remaining 4,601 acres would undergo associated-level disturbance to some extent. In this sense, 10,171 acres is an accurate figure.

LETTER 66

W Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

B. Hydrology
   3. Ground Water

Page: II-19, II-20

Quotation from DEIS:

> The Middle Knobloch and McKelvey Spring, and water chemistry comparisons suggest a similarity between McKelvey Spring water and ground water samples taken from a nearby observation well completed in the McKelvey coal seam.

Comment:

23. There is a group of observation wells and springs whose water chemistry sets them aside from the typical water quality of bedrock, coal, or alluvial aquifers. This group is made up of piezometers WN-12, WN-9, MLV-1 (N-12), and K-11; and the McKelvey Spring, the Knobloch Spring #1, and the Knobloch Spring #2. The only common denominator that can be found for this group is the proximity of each piezometer or spring to the Knobloch clinker or scoria. Therefore, the similarity in water chemistry between the McKelvey Spring and the MLV-1 (N-12) piezometer may be due to their relationship to the Knobloch clinker, rather than their relationship to each other. In accordance with this theory, the McKelvey coal seam may not be part of the source of the McKelvey Spring.

W Your analysis is noted. Still, the relatively constant spring discharge rate and the seasonal consistency of water quality suggest a more regional source for McKelvey Spring than the localized clinker deposit might provide. The adjacent clinker deposit may supplement recharge to McKelvey Spring, but data suggest that it is not the dominant recharge source. Localized sandstone deposits, southeast of McKelvey Spring, may also contribute recharge to the spring. (Note that there was a line inadvertently left out of the draft. This has been corrected.)

LETTER 66

X Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

B. Hydrology
   3. Ground Water

Page: II-20

Quotation from DEIS:

Ground water in the coal seams is generally under confined conditions, and at least some portions of the Knobloch seams are fully saturated throughout the entire mine plan area.

Comment: 24. This sentence should read:

. . . and at least some portions of the Knobloch seams are fully saturated, particularly in the northcentral part of the mine plan area. The Knobloch seams are not saturated in the extreme northeast portion of the mine plan area nor in the vicinity of the Tongue River alluvium.

X Your analysis is noted. The statement in the EIS accurately describes the saturation in the Knobloch coal.

LETTER 66

Y Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

B. Hydrology
  3. Ground Water

Page: II-20

Quotation from DEIS:

> Ground water in the Montco Mine plan area is generally potable...although poor quality water may occur in discrete areas.

Comment:

25. This sentence should read:

> Ground water in the Montco mine plan area, particularly from alluvial aquifers, is generally potable and suitable for most purposes. Existing ground water in the coal seams in the area are, however, of generally poor quality and have not been developed for domestic or agricultural use.

Y Your comment is noted. In general, ground water from coal aquifers in the Montco area is of poorer quality than associated alluvial and interburden aquifers. It is untrue, however, that coal aquifers have not been developed for domestic or agricultural uses in the area. The Montco permit application lists at least six wells completed in coal aquifers in the area. Available information indicates these wells have been used for either stock or domestic purposes.

LETTER 66

Z Section Affected:	II.	DESCRIPTION OF THE EXISTING ENVIRONMENT D. Vegetation 2. The Vegetation Study Area c. Ethnobotany
Page:	II-25	
Quotation from DEIS:		The first, red baneberry (*Actaea rubra*), would be expected to occur in moist streambank habitats; it probably was overlooked in the dense growth along the Tongue River.
Comment:	26.	As pointed out in the previous section of the DEIS (b. Rare or endangered species), the vegetation inventory was intensive, therefore, if red baneberry is present, it is *very limited* in the study area. Furthermore, areas where red baneberry would be expected to occur do not exist in the mine plan area.

Z We agree. Note that the information you quote was taken directly from Montco's permit application (vol. 16, app. F, p. F-61a).

LETTER 66

AA Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

D. Vegetation
   3. Proposed Permit Area
      a. Overview
         Table II-10

Page: II-26

Quotation from DEIS: field mint[1,2]

Comment: 27. Field mint is not included in Montco's revegetation plan as indicated by footnote 2.

AA The table has been corrected. Thank you for your comment.

LETTER 66

BB Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

F. Wildlife
   2. Habitat

Page: II-33

Quotation from DEIS:

> In general, wildlife habitat types are less specific than the vegetative communities discussed under vegetation, but the two can be compared. (See table II-4).

Comment:

28. The statement has reference to Table II-4 for comparison of vegetation communities and habitat types, but Table II-4 (pg. II-9) describes overburden and interburden characteristics. Table III-4 (pg. III-29) provides the comparison of vegetation communities and habitat types.

BB Thank you for correcting us. The revised sentence now refers to the correct table.

LETTER 66

CC Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

F. Wildlife
   3. Big Game

Page: II-34

Quotation from DEIS:

Fifty percent of winter habitat sightings were within breaks habitat;

Comment:

29. This sentence should read as follows:

Fifty percent of winter habitat sightings were within breaks habitat, generally from outside the mine plan area.

Only 91 mule deer out of 673 sightings or approximately 14% were seen within the mine plan area during winter of the baseline study period. Table G-6 of the Terrestrial Wildlife Baseline Report illustrates this.

CC The text has been revised to indicate the study area used in habitat analysis. Habitat use data within the mine plan area alone is not contained in the Terrestrial Wildlife Baseline Report. Data from the aerial survey area (table G-6) are therefore presented. This information provides the best picture of habitat use. Distribution is discussed in the preceding paragraph.

LETTER 66

DD Section Affected: II. DESCRIPTION OF THE EXISTING ENVIRONMENT

G. Climate
  5. Atmospheric Stability

Page: II-42

Quotation from DEIS:

> Atmospheric stability is a measure of vertical air motion.

Comment:

30. This sentence is incorrect and should read:

Atmospheric stability provides a measure of the ability of the atmosphere to disperse airborne effluents.

DD We agree. Thank you for your comment.

LETTER 66

EE **Section Affected:** III. IMPACTS OF THE PROPOSAL

A. Geology
  1. Summary of Impacts
  2. Topography and Geomorphology
    a. General effects

Page: III-1

Quotation from DEIS: 31. 1. Geologic impacts of mining in the North King mining unit would be limited primarily to erosion of topsoil from the longer and steeper reclaimed slopes. Special revegetation and topsoil replacement techniques could lessen this occurrence; however, some erosion would probably be unavoidable.

2.a. Geomorphic impacts within the North King unit would be minor, although some related impacts may be moderate to severe (see Hydrology and Soils, DEIS). The postmining topographic plan submitted by Montco (fig. III-1, DEIS) depicts a geomorphic surface which should be stable in a well-managed, postmining environment. Some planned hillslopes are steeper or longer than is ideal, but the necessity to match undisturbed and reclaimed surfaces makes this generally unavoidable. Such hillslopes, like those along the east edge of section 9 and the slopes adjacent to King Creek Valley, may experience erosion that may be largely avoided with special revegetation and topsoil replacement techniques. Some erosion and topsoil loss would be unavoidable.

Comment: Montco's Reclamation Plan details the techniques to revegetate slopes less

EE Thank you for your comment.

than or equal to 20 percent as required by the Department's regulations. Methodologies in the Reclamation Plan for the reclamation of steeper slopes will be expanded to insure the most efficient erosion control and revegetation techniques are utilized. These revisions, like the Reclamation Plan as a whole, are based on revegetation techniques developed for slope stabilization and which are applicable to site conditions. Emphasis is given to techniques developed in and for the State of Montana and those proven successful in other areas under similar conditions.

LETTER 66

FF Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
   1. Summary of Impacts

Page: III-1

Quotation from DEIS:

If Montco's proposed favorable overburden selection procedure does not work efficiently, topsoil piping could occur on gentler reclaimed slopes underlain by sodic spoils.

Adequate favorable overburden exists in the North King unit to cover the regraded spoils to a depth of 8 feet; however, separation of favorable from unfavorable material could be difficult.

Comment:

32. -1. We agree with the statement that adequate favorable overburden exists in the North King unit to cover the regraded spoils to a depth of 8 feet. Further detail on the volumes of required and excess favorable overburden available on a year-by-year basis is contained in the attached Table 1. It should be noted that these volumes do not include the "overstrip" area pursuant to the Department's request. These modifications to the Montco permit application are currently being coordinated with the Department's Reclamation Division.

-2. Montco proposes to separate favorable from unfavorable overburden by utilizing the isopach maps contained in

-34-

FF Due to changes in Montco's permit application, the Overburden section has been rewritten. (See chapter III, Geology, Overburden.)

LETTER 66

the Montco permit application. These maps, indicating favorableness of overburden for reclamation, were generated using all overburden drill hole and coal test hole information, as well as lithology, color, and clay content information. Trained personnel in the field can use this information to survey and stake areas and provide guidance to the shovel operator. Mixing of favorable and unfavorable material will be minimized by segregating the favorable and unfavorable overburden within the NKOB stockpile as proposed in the attached Figure 1. These modifications to the Montco permit application are also being coordinated with the Department's Reclamation Division.

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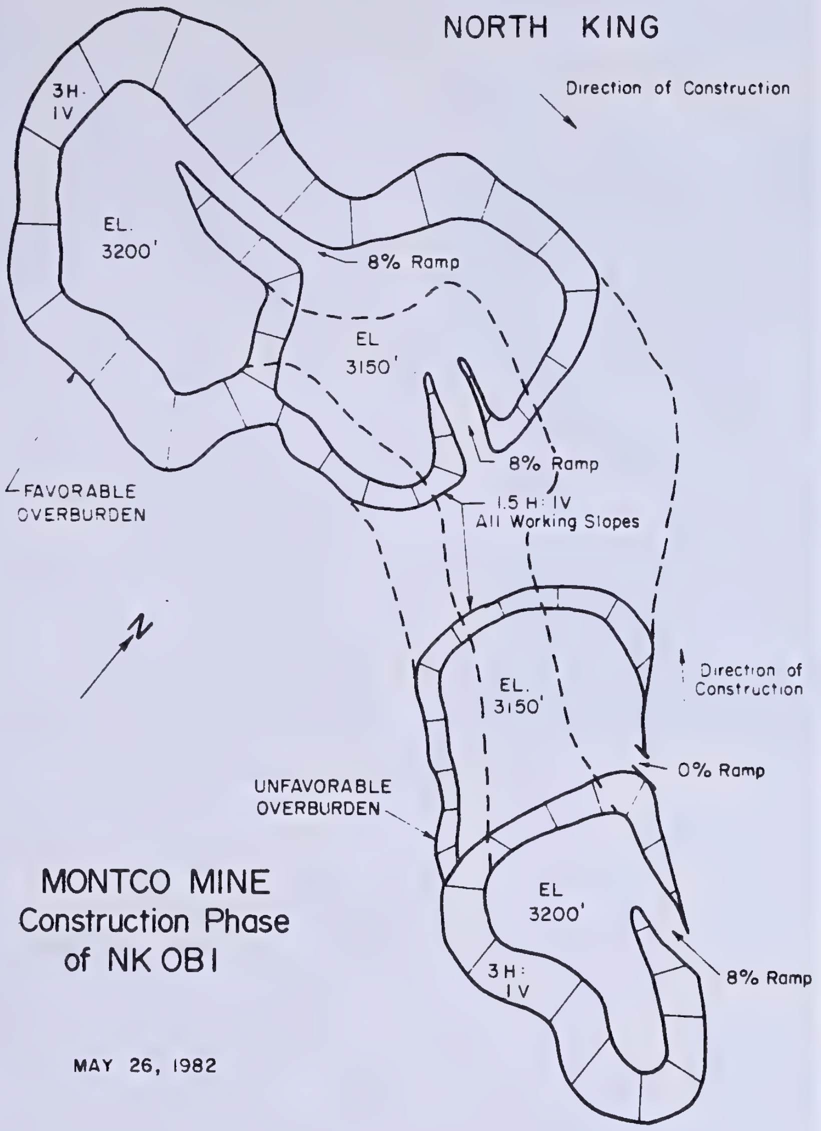
TABLE 1

Year	(1) Acres Backfilled	(2) Favorable OB Available (Mined - Stockpiled) LCY	(3) Favorable OB Needed For Top 8 Ft LCY	(4) Excess Favorable Overburden LCY
4	18.8	935,100	242,600	692,500
5A	58.0	5,425,000	748,600	4,676,400
5B	14.8	496,200	191,000	305,200
6	66.1	4,437,900	853,100	3,584,800
7	78.6	5,923,600	1,014,500	4,909,100
8	114.1	11,027,800	1,472,700	9,555,100
9	33.3	1,986,200 (5)	429,800	1,556,400
10	38.8	4,061,800 (5)	500,800	3,561,000

1. Column 11 in Table III-19 (Montco Permit Application).
2. Column 3 in Table III-19 times 1.148 minus Column 14 (Montco Permit Application).
3. Acres backfilled x 43560 sq. ft/acre x 8 ft deep/27 cu ft per cu yd.
4. Column 2 minus Column 3.
5. From stockpile excluding overstrip area.

Figure 1



MONTCO MINE
Construction Phase
of NK OB I

MAY 26, 1982

LETTER 66

GG Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
  2. Topography and Geomorphology
    b. Postmining landscape stability

Page: III-1, III-3

Quotation from DEIS: Entire section.

Comment:

33. -1. Montco agrees that currently there exists a scarcity of information on landscape stability of surface-mined lands. The DEIS suggestion that no recontouring should be done during winter and that only scrapers be used to recontour spoils is not justified. The DEIS statement stems from research by Groenewold and Rehm (1980) and is misinterpreted. The limitations of the study by Groenewold and Rehm must be realized. Their study centered around a 40-acre study area at the Indian Head Mine in North Dakota. A dragline mining method is utilized at the mine. During recontouring and reclamation, the dragline spoil piles are smoothed using bulldozers and occasionally using scrapers. A 1.2 acre plot within the study area was contoured with a scraper. This small plot (1.2 Ac.) did not produce any subsidence or piping features during the period of study. From this limited information, the DEIS conjectures that settlement is less in scraper-contoured areas than in dozer-contoured areas. Conversely, maps presented in the study show dozer-contoured areas as large as five acres that

GG 1) The text has been rewritten and corrected. Thank you for your comment.

LETTER 66

are devoid of subsidence or piping features. Furthermore, Groenewold and Rehm (1980) found that area-wide settlement in recontoured spoils was a natural process common to all recontoured spoil areas and caused minimal landscape disruption. Differential settling also occurs throughout the backfill, not only in the top few feet involving the recontouring. Therefore, it is impractical to prohibit recontouring during the winter and limit the recontouring of spoils to the use of scrapers only.

Montco will utilize dozers for recontouring due to the truck/shovel method of mining where overburden is transported in trucks and replaced over the advancing backface. There appears to be no economically feasible way of recontouring with scrappers with this type of mining method.

-2. This section of the DEIS also states that the North King mining unit overburden is primarily clayey and silty. This statement is in conflict with statements contained on pages III-5 and III-8 of the DEIS, which state that clayey material occurs in only about 11 percent of the North King mining unit overburden. These pages also state that Montco can avoid a major portion of this clayey material and that it would also be diluted to an acceptable level during handling. No mention is made of silt contents.

2) The text has been rewritten and corrected. Thank you for your comment.

LETTER 66

HH Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
   5. Overburden
      b. North King mining unit

Page: III-4, III-5

Quotation from DEIS:

However, separation of favorable from unfavorable materials may present some problems. Although Montco's selective overburden handling plans would aid in this separation process, inherent errors in this process could allow some unfavorable overburden to be placed in the rootzone.

Comment:

34. Montco proposes to segregate favorable from unfavorable overburden (See Montco's comment on III. Impacts of the Proposal-A. Geology - 1. Summary of Impacts). (p.34-35 comment 32).

HH Due to changes in Montco's permit application, the text has been rewritten. (See chapter III, Geology, Overburden.)

LETTER 66

II Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
  5. Overburden
    b. North King mining unit
      2) Physiochemical properties that may restrict reclamation

Page: III-5

Quotation from DEIS:

Sodicity. The sodium adsorption ratio averaged 35.5 in 50 percent of the core lengths drilled in the North King unit. If such material were placed in the rootzone, reclamation could be adversely affected due to poor overburden permeability and root penetration.

Comment:

35. The statistic that 50% of the overburden has an average SAR of 35.5 presents a very inaccurate picture, and is not justified. The DEIS did not do an adequate job in describing sodicity along with up-to-date sodic minesoil reclamation technology. The probability for upward sodium migration from spoils into topsoil was not discussed.

The above statistic gives the impression that half the overburden is severely sodic and is not suitable for use in the rootzone, which is not the case. The Montco permit application (Appendix N-Overburden Analysis) discussed in detail how recent research (Dollhopf et al. 1981) showed that SAR levels as high as 23 in the spoil rootzone did not limit plant productivity. It would be best to state that 50% of the overburden had SAR levels <12 (favorable), 30% of the overburden had SAR levels 12 to 20 (moderately favorable), and 20% of the overburden had SAR levels >20 (unfavorable).

II Due to changes in Montco's permit application, the text has been rewritten. (See chapter III, Geology, Overburden.)

LETTER 66

JJ Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
  5. Overburden
    b. North King mining unit
      2) Physiochemical properties that may restrict reclamation

Page: III-5

Quotation from DEIS:

Nickel. The DSL suspect level for nickel (Ni) is 1.0 ppm. At or near this level, nickel has been shown to reduce photosynthesis and tissue production in various plants (Carlson et al., 1975; DeKock, 1956). In the North King unit, concentrations average 4.6 ppm in 57 percent of the core lengths taken. This could be a toxic level;...

Comment:

36. Applying results from the Carlson et al. (1975) and DeKock (1956) studies to the Montco site is at best risky, and probably not applicable. The research by Carlson et al. (1975) tested the effect of increasing Ni levels in nutrient solutions on only corn and sunflower plants. As Ni concentrations were increased incrementally to 6 ppm the net photosynthesis decreased, resulting in a 25% reduction for sunflower and 10% reduction for corn at 6 ppm Ni. DeKock (1956) added 2 ppm Ni to a nutrient solution and found growth of mustard was decreased by approximately 80%. Therefore for mustard, corn and sunflower, the decrease in productivity varied by as much as 800% between these plants.

JJ The Department no longer considers nickel toxicity to be a potential problem in alkaline environments. The text has been rewritten. (See chapter III, Geology, Overburden.)

LETTER 66

Mustard, corn and sunflower are not part of the seed mixture for revegetation in the Montco project area. The grasses, forbs and shrubs proposed in the seed mixture may be more tolerant than plants studied by Carlson et al. and DeKock. For this reason, we believe the DEIS statement that 4.6 ppm Ni in the North King Unit may be toxic is both speculative and misleading. Those sentences should be either deleted or explained in greater detail to indicate the speculative nature of the interpretation.

LETTER 66

KK Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
   5. Overburden
      b. North King mining unit
         3) Potential problems with selective overburden handling

Page: III-9

Quotation from DEIS:

There are two main problems with the proposed selective overburden handling process. First, trace elements such as nickel (Ni) do not correlate well with overburden lithology and color and, therefore, cannot with accuracy be selectively separated using physical appearance alone. The company should thus take precautions to avoid overburden high in nickel. During the required final check of the rootzone overburden, the company should take special note of pH. If the pH of a backfill sample is less than 7.0, the material should be analyzed for Ni. Material high in nickel should be buried under 8 feet of suitable material. (See chapter IV, Mitigating Measures.)

Comment:

37. It is felt that trace metal technology is not adequate for the DEIS to state what is a high level of Ni. If post-mine sampling of recontoured spoils reveals a 5 acre area having a pH of 6.5 and a mean Ni concentration of 4 ppm it would be very expensive (several tens of thousands of dollars) to solve the problem with material handling. The cost in conjunction with not really knowing if 4 ppm Ni is a toxic problem to grasses, forbs and shrubs is a potential wasteful exercise.

KK **Please see answer JJ.**

LETTER 66

If the Department feels that postmine Ni sampling should be required, then they should initiate research to identify toxic levels of Ni on grasses, forbs and shrubs. Guidelines could then be developed to justify expensive rehandling of materials.

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LL Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
  5. Overburden
    b. North King mining unit
      3) Potential problems with selective overburden handling

Page: III-9, III-10

Quotation from DEIS:

Second, there are uncertainties with the correlations between lithology-color and overburden properties. A potential thus exists for unfavorable overburden --material high in salt, sodium, and clay--to be placed in the rootzone during reclamation. Because of these uncertainties, Montco should rely heavily on the isopach maps included with the permit application. These maps, indicating favorableness of overburden for reclamation, were generated using all overburden drill hole and coal test hole information, as well as lithology, color, and clay content information. Their use would require a trained person in the field who would survey and stake the areas and provide guidance to the shovel operator. (See chapter IV, Mitigating Measures.)

Montco could increase the rootzone overburden sampling rate to one sample every acre or greater to further reduce the possibility of placing unfavorable material in the rootzone. (See chapter IV, Mitigating Measures.)

Comment: 38. Montco proposes to segregate favorable from unfavorable overburden (See Montco's comment on III. Impacts of the Proposal - A. Geology - 1. Summary of Impacts). (p. 34-35 comment 32).

LL Due to changes in Montco's permit application, the text has been rewritten. (See chapter III, Geology, Overburden.)

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MM Section Affected: III. IMPACTS OF THE PROPOSAL

- A. Geology
  - 5. Overburden
    - b. North King mining unit
      - 3) Potential problems with selective overburden handling

Page: III-9

Quotation from DEIS: Second, analysis shows that a certain percentage of the usually favorable material will actually be unfavorable.

Comment: 39. It is not understood what is meant by this statement. Clarification is required.

MM The overburden section has been completely rewritten. (See chapter III, Geology, Overburden.)

LETTER 66

NN Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
   5. Overburden
      b. North King mining unit
         4) Overburden Stockpile

Page: III-10

Quotation from DEIS:

According to the permit application, Montco is planning to construct only one stockpile for North King unit overburden. But since the company is also proposing to separate favorable from unfavorable overburden, two separate stockpiles should be constructed. This would ensure that contaminated material would not mix with favorable overburden. (See chapter IV, Mitigating Measures.)

Comment:

40. Montco proposes to segregate favorable from unfavorable overburden in the NKOB stockpile (See Montco's comment on III. Impacts of the Proposal - A. Geology - 1. Summary of Impacts). (p. 34-35 comment 32).

NN Due to changes in Montco's permit application, the text has been rewritten. (See chapter III, Geology, Overburden.)

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00 Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
   5. Overburden
      c. Other mining units
         1) South King mining unit

Page: III-10

Quotation from DEIS:

Based on the limited number of overburden samples taken (five drill cores comprising 154 sample increments) in the South King mining unit, salinity (EC), sodicity (SAR) and nickel are the most probable factors that could limit successful reclamation.

Comment:

41. See Montco's comments regarding sodicity and nickel on III. Impacts of the Proposal - A. Geology - 5. Overburden - b. North King mining unit - 2) Physiochemical properties that may restrict reclamation; and, 3) Potential problems with selective overburden handling.

(p. 41 comment 35).
(p. 42-43 comment 36).
(p. 44-45 comment 37).

00 The text has been rewritten. (See chapter III, Geology, Overburden.)

LETTER 66

PP Section Affected: III. IMPACTS OF THE PROPOSAL

A. Geology
  5. Overburden
    c. Other mining units
      4) South Gate mining unit

Page: III-13

Quotation from DEIS:

Molybdenum (Mo) concentrations may also pose a problem. Mo is rarely toxic to plants, but has been known to cause molybdenosis in cattle and sheep which graze on plants containing high levels of Mo. Molybdenosis is a copper deficiency disease which occurs in ruminants, caused by Mo depressing the physiological availability of copper. In the South Gate unit, molybdenum concentrations averaged 1.9 ppm in 32 percent of the core lengths tested. The actual danger of these levels is unknown; little information is available on the relationship of soil Mo levels and plant uptake. But to decrease the possibility of molybdenosis, legumes, plants that accumulate Mo, should not be included in the revegetation seed mixture. In addition, Mo analysis should be included in the backfill sampling program. Material having levels of Mo approaching 1.0 ppm or greater should be buried beneath 8 feet of suitable material. (See chapter IV, Mitigating Measures).

Comment: 42. The mitigating measure is in conflict with existing reclamation technology.

PP We agree that part of the proposed mitigating measure should be deleted because there are currently no known relationships between molybdenum levels in the soil (or overburden) and the resulting plant material when the plants are composed of native range species. (Please note text change.) However, the Department feels that the 1.0 ppm threshold value is useful as a guide, especially when legumes are proposed in the revegetation mixture. (Montco's current revegetation list includes two legumes.) Please see the letter 25, answer C.

Montco's statement that "there is no known relationship between molybdenum (Mo) concentrations in soil and in plants growing on that soil" is not true. This may be the case for most native range species growing in eastern Montana, but a number of plants do exhibit a good correlation between plant and soil molybdenum levels.

Vlek and Lindsay (1977) studied the relationship using alfalfa and alkaline Colorado pasture soils in greenhouse experiments. For water-extractable molybdenum, they observed a correlation coefficient of r=0.98; for ammonim carbonate-extractable molybdenum, the coefficient was r=0.977. When this experiment was repeated in the field, good correlations were also found, although the coefficients were slightly lower (r=0.86 and 0.89, respectively).

In other greenhouse experiments using total molybdenum methods and alkaline soils, Nayyar et al. (1977) reported the following correlation coefficients: Japan rape, r=0.997; cowpeas, r=0.999; and maize, r=0.994.

Although these species are not included in Montco's revegetation mixture, note that there are known relationships between molybdenum concentrations in soil and plants growing in that soil.

The text has been changed to reflect the latest findings by Neuman and Munshower (1983) at the Big Sky Mine near Colstrip. Please see chapter III, Geology, Overburden, South Gate Mining Unit.

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There is no known relationship between Mo concentrations in soil and in plants growing on that soil. The point being that it is false to assume high levels of Mo in soil (i.e. >1 ppm) will result in high levels in plant material which in turn creates the molybdenosis problem. It is error to assume this relationship exists. Neuman and Munshower (1982) are presently studying this phenomenon and preliminary results show no relationship between Mo levels in topsoil and the resultant plant material. Therefore, the mitigating measure should be deleted.

LETTER 66

QQ Section Affected: III. IMPACTS OF THE PROPOSAL

B. Hydrology
  1. Summary of Impacts

Page: III-14

Quotation from DEIS:

Montco's drainage control plan is not in compliance with the Department of State Land's (DSL) administrative rules, which require that surface runoff from all disturbed areas be routed through sediment ponds.

Comment:

43. The Montco hydrologic control plan is designed to control surface runoff and erosion and sedimentation during and after mining. The surface runoff from disturbed areas is directed through sediment ponds which have been designed to trap and retain sediment. Runoff from the facilities area is routed through sediment pond SP-15 or SP-16. Runoff from the various topsoil stockpiles is routed through sediment ponds SP-4, SP-5, SP-6, or SP-20. Runoff from the actual mined area is routed through sediment ponds SP-7, SP-8, SP-9, SP-10, SP-11, SP-12, SP-13, or the sediment pond to be left as a stock watering pond. Thus, all potentially disturbed areas of the North King Unit are adequately drained and serviced by sediment ponds. Drainage and sediment control structures in the mined area are to be emplace prior to disturbance of the area.

QQ Your comment is noted. Please refer to new text prepared for the final EIS, based on a new drainage control plan submitted by Montco.

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RR	Section Affected:	III. IMPACTS OF THE PROPOSAL B. Hydrology 1. Summary of Impacts	RR	We agree. See text change.
	Page:	III-14		
	Quotation from DEIS:	McKelvey Spring would probably dry up as a result of mining the North King unit.		
	Comment:	44. This sentence should be modified to read: McKelvey Spring may dry up as a result of mining the North King unit.		

LETTER 66

SS Section Affected: III. IMPACTS OF THE PROPOSAL

B. Hydrology
1. Summary of Impacts

Page: III-14

Quotation from DEIS:

Extreme flood flows in King Creek and the Tongue River could damage a sediment pond and the railroad loop embankment, resulting in downstream sedimentation and disrupted mining activities.

Comment:

45. The sediment pond referred to is designed as an excavated or incised pond. Since this pond is located away from the main channel of King Creek, it would more likely serve as a repository for sediment during such a flood event, rather than a source of increased sedimentation.

The railroad loop embankment is located at least 300 feet from the active Tongue River channel. Water velocities at the edge of the flood plain should be low during such a flood and degradation of the embankment would be minimal. Furthermore, the quality of water during a 100-year event will be so poor that any foreseeable sedimentation contribution from the rail loop would be insignificant. In addition, the relocated county road would be located between the railroad loop and the flood plain and therefore, would serve as some protection for the loop embankment.

SS We agree that the sediment pond, located near King Creek, would act as a sediment repository rather than as a sediment contributor. Because of the impoundment's location, however, extreme flood flows in King Creek could conceivably damage the sediment pond.

Extreme flood flows in the Tongue River probably would not damage the railroad loop embankment, due in part to the added protection of the relocated county road. We agree that the amount of sediment contributed by the railroad loop embankment during such a flood would probably be insignificant, although no data are available to quantify this.

LETTER 66

TT Section Affected: III. IMPACTS OF THE PROPOSAL

B. Hydrology
  2. Surface Water
    a. Sediment and runoff

Page: III-14

Quotation from DEIS:

Because Montco has submitted a surface drainage control plan for the North King unit (Fig. I-5) that would allow major areas of disturbed surface to drain uncontrolled off the permit area during mining, runoff and sediment could discharge downslope or downstream, beyond the permit boundary. Similarly, Montco has proposed surface drainage control for neither the surface facilities areas nor much of the postmining surface.

Comment:

46. The hydrologic control plan of the Montco Mine permit application describes both the surface water control and sediment control plan in Volume 2, Chapter III, Section 3 for the entire permit area. Figure I-5 of the DEIS shows the surface water control and sediment control plan for the facilities area and various stockpiles only. Figure I-5 does not show the hydrologic control plan for the actual mined area. Therefore, reference is made to Map III-3 and Map III-4 found in Montco's Mine Permit Application Volume 2, Chapter III, Mine and Operations Plan for details of the surface water control and sediment control plan for the facilities area and the actual mined area.

TT Figure I-5 has been revised to show all sediment control structures.

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UU Section Affected: III. IMPACTS OF THE PROPOSAL

B. Hydrology
  2. Surface Water
    d. Additional impacts

Page: III-17

Quotation from DEIS:

> McKelvey Spring (Spring 35, Fig. II-1) would probably dry up as result of mining.. . If it is the former, Montco's overburden stockpile would intercept most recharge and cause the spring to eventually dry up.

Comment:

47. The first sentence should be revised to read:

-1. McKelvey Spring (Spring 35, Fig. II-1) may dry up as a result of mining.

-2. Flow from McKelvey Spring has been observed as relatively constant at 2 to 5 gpm apparently regardless of climatic and local recharge conditions. Since the source of the McKelvey Spring waters is not known, the assertion that Montco's overburden stockpile will intercept most recharge is speculative and should not be emphasized. The recharge area for this spring is likely to be much larger than the area to be covered by the overburden stockpile. It would be more accurate to state here that McKelvey Spring may potentially be affected by mining.

UU

1) We agree. See text change.
2) We agree. See text change.

LETTER 66

VV Section Affected: III. IMPACTS OF THE PROPOSAL

B. Hydrology
  2. Surface Water
    d. Additional impacts

VV See answer SS.

Page: III-17

Quotation from DEIS:

Flood flows of that magnitude could damage and erode the railroad bed and at a minimum disrupt mine loadout activities and cause downstream sedimentation.

Comment: 48. See Montco's comments on III. IMPACTS OF THE PROPOSAL, B. Hydrogolgy, 1. Summary of Impacts. (p. 54 comment 45).

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WW Section Affected: III. IMPACTS OF THE PROPOSAL

B. Hydrology
3. Ground Water

Page: III-18

Quotation from DEIS:

The wells most affected would be one (owned by the U.S. Forest Service) that lies just north of spring 3 and another (owned by B.M. Haley) that lies 2 miles east of the North King unit in the northwest corner of Section 12.

Comment:

49. -1. The well in Section 12 is actually owned by the U.S. Forest Service and apparently is completed in the Knobloch coal seam. Montco's ground water model does not predict any drawdown for the Knobloch seam in that area (it is nearly 12,000 feet from the active North King unit). Therefore, the well should not be affected.

-2. The other well is located in Section 5 and is actually owned by B. M. Haley. Since the Knobloch and McKelvey seams do not exist in Section 5 and because the well is over 5,000 feet from the North King unit, it does not appear that the well will be affected.

WW Thank you for correcting us on well ownership.

Comparison of data provided by Montco indicates that drawdown may extend at least two miles from the North King unit. It is thus plausible that the Forest Service well, located in the northwest corner of section 12, may be affected.

It is true that the B.M. Haley well is probably not completed in coal units to be mined. Still, the cone of depression may extend through geologic units associated with the well, potentially causing an impact. Drawdowns in wells within a two mile radius of an active mine have been demonstrated at other minesites in southeastern Montana.

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XX Section Affected: III. IMPACTS OF THE PROPOSAL

C. Soils
1. Summary of Impacts

Page: III-20

Quotation from DEIS:

Some impacts on the soils of the Montco Mine plan area would be unavoidable during a strip-mining operation. These impacts include loss of natural soil profile, soil structure, organic matter, pore space and pore continuity. These may result in increased runoff and erosion rates, reduced infiltration and percolation rates, and reduced water-holding capacity for an unknown time following reclamation.

Because of these unavoidable impacts, the area would probably be more sensitive to mismanagement and drought than before disturbance, for perhaps several decades after mining.

Comment:

50. These potential impacts have been overcome on other mining operations resulting in successful revegetation. Loss of the soil porfile is, to a degree, mitigated by handling soils according to the two-lift principal which replaces surface and subsurface soils to their general respective positions. The loss of soil structure would also appear insignificant since Montco's commitment to ripping, discing, and seedbed preparation will prevent compaction and benefit infiltration and percolation rates. Organic matter will be lost but the planting of cover crops and immediate redistribution of topsoil, where possible, will address this problem. The impact to pore space and continuity is addressed through seedbed preparation

XX Although some mining companies have established vegetation on mined lands, no decisions have yet been made regarding success under the provisions of the law (eg, species diversity, permanence, response to grazing). Further, most vegetated areas are in their infancy and have not been subjected to long-term management.

We agree, to some extent, that soil profile loss is mitigated by the two-lift method. However, in some soils, relatively important subsurface horizons (e.g. argillic) may be lost even with a two-lift salvage operation.

According to Montco's permit application, about 70 percent of the soil salvaged in the permit area (North King unit and facilities area) would be stockpiled for various periods of time during the first 6 years of the operation. Therefore, the "immediate redistribution" of soil you mention would apply only to 30 percent of the volume salvaged in the first 6 years.

Since reclamation research is a relatively new field, some speculation is necessary when attempting to predict the future. Montco is also speculating when stating that these unavoidable impacts are insignificant because of proposed seedbed preparation techniques, etc. Although methods such as ripping and discing benefit reclamation, not enough data are available to make a "significance" judgement. (Please see your comments (P, R, S) regarding significance.)

and cover crop planting. With respect to increased runoff and erosion, Montco's plan to reduce overall slopes, conduct reclamation in a timely manner, implement proven reclamation techniques, and replace appropriate surface soils will serve to mitigate these impacts. Montco's plans for special handling of overburden (replacement of favorable material on the surface to an 8-foot depth) will add to the water-holding capacity of the reclaimed area.

Reclamation bond monies will be held for the time specified by law to ensure that reclamation success is attained. Montco has committed, if granted the permit, to attain successful reclamation by the end of this period through methods outlined in the Reclamation Plan. Assuming that bonding periods are based on a reflection of what is achievable relative to Montana conditions, a release of Montco's bond following reclamation infers that stability has been achieved and stable plant communities have been established. Further, it is stated in the DEIS that plant productivity could actually increase after reclamation to a level higher than that prior to mining. Given the bonding requirements and such statements, it does not seem in order to speculate on a higher sensitivity of the site following reclamation.

LETTER 66

YY Section Affected: III. IMPACTS OF THE PROPOSAL

C. Soils
  2. North King Mining Unit
    a. Soil cover, depth, and quality

Page: III-20, III-22

Quotation from DEIS: Paragraphs 1 through 5

Comment:

51. -1. The discussion of potential impacts in the referenced paragraphs fails to consider mitigating measures (See Montco's comments on page iii of the DEIS-SUMMARY - Summary of Impacts - Soils; and Vegetation). (p. 1,2 comment 1,2).

-2. In regards to the calculation of soil salvage depths, apparently the DEIS misunderstands the methodology Montco used. Montco did consider all soil sample data for each mapping unit by first calculating average salvage depths for the entire survey area. The data from the NKMU was then specifically analyzed to determine if the average depth required modification for a specific mining area. In no case was soil data from elsewhere in the survey ignored. Montco sampled soils to a degree far above the Department's recommendations, which allowed salvage recommendations to be tailored to specific areas within the soil survey boundaries, given the wide distribution of sample locations for each soil unit. No soil scientist can ignore the natural variation within a soil. But salvage

YY 1) Please see answers A, B, and XX.

2) The draft EIS does not state that Montco ignored the data from the entire mine plan area, but that the data taken nearest the proposed permit area was weighted more heavily than other data. We question how "data from the North King unit was specifically analyzed" when only 10 samples of the 16 mapping units (excluding non-soil units) found in the North King unit were actually taken from the North King unit. If other data exist, they should have been included in the permit application.

While it is true that Montco may have considered the same data presented in the EIS, Montco apparently decided to propose the deeper salvage scenario (best case) as discussed in the draft EIS. The only explanation given in the permit application is that mixing would occur and permit area salvage volumes were "tailored" based on data from the "immediate locale." Since only limited data were presented in the permit application from the "immediate locale" (permit area), we question Montco's "tailored" salvage volumes. In its permit application, Montco did not specifically discuss how the soil salvage depths were derived for the entire mine plan area compared to the permit area, except what is stated above. Therefore, we needed to create our own scenarios based on everything given in the permit application.

Please note text change in chapter III, Soils. The current proposed salvage depths are a product of several discussions between Montco and DSL, and more adequately reflect the total variability of the soils, since all data were weighted evenly.

interpretations can be tailored for a given area, based on how soil salvage considerations vary within that area from the overall modal concept. The DEIS states that Montco's procedure was erroneous, and then devises a "best case - worst case" scenario exactly as Montco did. The DEIS basically used Montco's method, but states it in a way which reflects on Montco in an unwarranted manner. The DEIS reaches the same conclusions as Montco and used alternate salvage scenarios as Montco did, but has made it appear in the narrative that Montco did not consider the same data. No one can assess variation from a modal concept of a soil without first deriving that modal concept based on all available data. If someone can devise a better method for incorporating all of Montco's data into a useable overall salvage figure, that can also be further tailored to a specific mining area, we'd appreciate being informed of it. It appears the DEIS has duplicated Montco's effort while at the same giving unwarranted criticism for it.

LETTER 66

ZZ Section Affected:

III. IMPACTS OF THE PROPOSAL

C. Soils
  2. North King Mining Unit
    a. Soil cover, depth, and quality

Page: III-22

Quotation from DEIS:

Even with a carefully supervised soil salvage operation, the volume of soil available would still be far less than optimal. A study in Colorado showed that as soil depth increased from 0 to 28 inches, vegetation production consistently increased (Colorado School of Mines Research Insitute, 1980).

Comment:

52. The final results of the Colorado study are somewhat different than those presented in the DEIS. This study team investigated 12 sites in Wyoming, Montana and North Dakota which resulted in four guidelines.

1) If spoil rootzone has no limitations then 20 inches of topsoil was optimum.

2) If spoil rootzone is sodic then 32 inches of topsoil was optimum.

3) If spoil rootzone was acid-producing, then more than 5 ft. of topsoil was optimum.

4) At some sites where the spoil rootzone had no limitations, the bare spoils produced plant material as well as topsoiled areas.

ZZ Chapter III of both Overburden and Soils has been completely rewritten to reflect revisions in the permit application. The results of the referenced study, of which the final report is now cited Barth and Martin (1982), have been incorporated into the rewritten soil discussion. (See chapter III, Soils.)

Therefore, if Montco constructs a spoil rootzone with 8 ft. of favorable material then approximately 20 inches may be optimum. However, as evidenced by some mine sites less topsoil, for example 12 to 17 inches, may be just as good as suggested by case 4) above.

LETTER 66

AAA Section Affected:

III. IMPACTS OF THE PROPOSAL

C. Soils
   2. North King Mining Unit
      a. Soil cover, depth, and quality

Page:

III-22, III-23

Quotation from DEIS:

> Another potential soil problem remains. Montco proposes to use a large amount of the overburden from the western part of the North King unit, which consists largely of burn material (porcelanite, commonly called scoria). Although chemically favorable for rootzone reclamation, this material has a high content of coarse fragments. Fine soil may consequently fall through cracks and large pores, decreasing soil cover depth in places. How much soil loss would occur is unknown, but with a total soil cover depth of only 12 to 17 inches, any loss could be significant. In addition, as part of the rootzone, this droughty material could cause water stress in plants if not reduced in size. These problems could be mitigated by crushing the scoria before redistribution. (see chapter IV, Mitigating Measures).

Comment:

53. The use of scoria materials for backfilling will be somewhat limited due to the exclusion of the "overstrip" area (see Montco's comment on III. Impacts of the Proposal - A. Geology - 1. Summary of Impacts). While drilling the burn material, IntraSearch geologists observed that the majority of the

AAA Please see the revised Overburden section that discusses the quality of the burn material.

LETTER 66

scoria was very lightly baked and although red in color, it still retained the physical characteristics of the shales, siltstones, and sandstones. In addition, any scoria used as backfill will, due to mining operations, be mixed with fine textured overburden materials. There will not be a layer of pure Scoria between the backfilled overburden and respread topsoil. Further, any broken scoria fragments mixed with the backfill and occuring on the surface can be of benefit. Surface roughness caused by such fragments will serve, like ripping, to inhibit slippage of applied topsoil. Since the potential impact stated in the DEIS is hypothetical (topsoil falling through large cracks and pores), mitigative measures should be developed only if the problem arises during the operation. (p. 34-35 comment 32).

LETTER 66

BBB Section Affected: III. IMPACTS OF THE PROPOSAL

C. Soils
  2. North King Mining Unit
    b. Soil erosion

Page: III-23

Quotation from DEIS:

On slopes greater than 10 percent, sand and silt are easily eroded. In contrast, medium - to heavy-textured soils--with moderate to high amounts of clay--resist erosion, owing to greater cohesion between particles. In the North King unit, 20 percent of the soil material proposed for salvage is sandy-textured. Consequently, placing soil on grades over 10 percent and in drainages could lead to accelerated soil loss.

To avoid soil loss, the company should separate and store the sandy-textured material during the salvage operation and redistribute it on slopes of less than ten percent, outside of drainages. (See chapter IV, Mitigating Measures).

Comment:

54. The DEIS statement is not consistent with either the Department's (Reclamation Division) recommendations or principles of soil erosion as described by the Universal Soil Loss Equation (USLE). For example , at the Big Sky Mine (Colstrip) it has been recommended by the Department that less erodible topsoil (sandy) be selectively placed as cover soil on steeper slopes (>10%). Finer textured topsoils (loam) was recommended to be placed on slopes < 10%.

BBB The reference to the recommendation made by the Department at the Big Sky Mine is incorrect. In fact, the opposite recommendation was made (i.e. that the sandy soils be placed on slopes less than 10 percent and finer-textured soils be placed on slopes greater than 10 percent). The sandy soil referred to was the Busby fine sandy loam, which is widespread at the Big Sky Mine and usually contains a considerable amount of fine and very fine sands.

The Department agrees that soil erodibility increases as the silt content increases. However, fine-sand-sized materials are also easily eroded (Schafer et al., 1979). Obviously, coarser sands would have less runoff due to a relatively high infiltration rate and would not be considered erosive. But a high proportion of fine sands in the soil would result in greater runoff and lower infiltration rates, and the tiny sand particles would be easily eroded. Please see the new discussion on soil erosion in chapter III, Soils.

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The Department's philosophy stems from research in the United States that indicates the soil erodibility factor (K) increased as the silt content increased (ARS, 1975). Specifically, a loam soil may have a K value approximately ten times greater than a sandy soil.

Therefore, the DEIS suggestion that sandy materials placed on steeper slopes will accelerate erosion seems to be in error.

In addition, the 10 percent slope criteria is too restrictive since only 20 percent of the soil is sandy-textured. This material will be stockpiled and mixed with the other soils and become cohesive enough to remain on slopes exceeding 10 percent. Topsoil to be replaced by direct backhaul without passing through the stockpile can be selectively replaced as recommended.

LETTER 66

CCC Section Affected: III. IMPACTS OF THE PROPOSAL

C. Soils
  3. Proposed Facilities Area
    b. Soil erosion

Page: III-24

Quotation from DEIS:

The proposed postmining topography of the facilities area consists of slopes of 5 to 25 percent. Seventy-five percent of the soil proposed for salvage is sandy-textured. As a result, without selective placement, some of this sandy-textured material would probably be placed on steep slopes and in drainages, where it could rapidly erode.

Comment:

55. Apparently the 75 percent figure used in the DEIS incorporates tree-lift materials, which if used as a secondary topsoil lift and thus placed beneath the surface, should be fairly erosion-resistant due to rapid infiltration and coarse fragment volumes. If these materials are used as a secondary topsoil source, there is potential for mixing with heavier-textured (more clayey) materials which could help serve as a particle "binder" and improve waterholding capacity. The chemically clean tree-lift materials would in turn help offset some of the chemical attributes of other secondary-lift materials.

If on the other hand, tree-lift materials are not included as a topsoil source, the 75 percent figure drops to approximately 15-20 percent.

CCC The 75 percent figure used in the draft EIS does not include tree-lift soils. (See footnote 3, table III-3 p. III-25 of the draft.) In any case, due to permit application changes, the overall (North King plus facilities areas) percentage of sandy soils has dropped to about 14. Please see rewritten text in chapter III, Soils.

LETTER 66

DDD Section Affected: III. IMPACTS OF THE PROPOSAL

C. Soils
4. County Road Relocation and Railroad Transportation Corridor

Page: III-26

Quotation from DEIS:

For both scenarios, Montco would convert part of the railroad corridor to a road suitable for county use after mining activities end. The segment of the county road previously relocated to the west would be relocated again to the transportation corridor, and the disturbed area on the flood plain could be reclaimed.

Comment:

56. This statement is not consistent with the transportation corridor plan discussed in Chapter I on page I-5. The statement on page I-5 is correct and reads as follows:

Plan 1: The Tongue River Railroad is extended through the permit area during the life of the Montco Mine.

If the railroad were extended through the permit area, Montco would apply for bond release on the part of the mainline corridor east of the Montco siding and loop. Later, when the Montco mining is completed, Montco would remove its track and ties from the western part of the mainline corridor and apply for bond release on that area. Because the mainline would remain after mining, Montco proposes that stabilized cuts and fills not be redisturbed after mining ends. Instead, Montco would request bond release on the corridor under the alternative reclamation provisions of the regulations governing mining. Final reclamation of the mainline would be regulated by the I.C.C.

DDD You are correct. The company would convert part of the railroad corridor to a road suitable for county use only under the second scenario, not both (Montco, 1983, vol. 2, chap. III, p. III-2-26 and III-2-27). The text has been corrected.

LETTER 66

EEE Section Affected:	III. IMPACTS OF THE PROPOSAL D. Vegetation 1. Summary of Impacts
Page:	III-27
Quotation from DEIS:	But because of the potential problems discussed in the sections on Soils and Overburden, vegetation failures could occur on small areas up to several acres in size.
Comment:	57. See Montco's previous comments on: SUMMARY - Summary of Impacts - Soils and Vegetation; and III. Impacts of the Proposal - A. Geology - 1. Summary of Impacts. (p. 1-2 comment 1 and 2). (p. 34-35 comment 32).

EEE See answers A, B and FF. See also text revisions in chapter III, Vegetation.

LETTER 66

FFF Section Affected: III. IMPACTS OF THE PROPOSAL

D. Vegetation
  2. North King Mining Unit
    b. Soil and overburden relationships

Page: III-28

Quotation from DEIS:

But the proposed program of separating favorable from unfavorable overburden in the field based on lithology and color combination has problems.

Comment:

58. Montco proposes to segregate favorable from unfavorable overburden (See Montco's comment on III. Impacts of the Proposal - A. Geology - 1. Summary of Impacts). (p. 34-35 comment 32).

FFF **Based on Montco's revised overburden handling plans, this part of the vegetation section has been rewritten. See chapter III, Vegetation.**

LETTER 66

GGG Section Affected: III. IMPACTS OF THE PROPOSAL

D. Vegetation
  2. North King Mining Unit
    c. Erosion effects

Page: III-28

Quotation from DEIS:

As discussed in Soils and Chapter IV, Mitigating Measures, it would be better to identify sandy-textured soils prior to salvage, store them separately, and respread them on gentler slopes, avoiding drainages. This would reduce soil and vegetation loss from erosion.

Comment:

59. See Montco's previous comments on:

III. Impacts of the Proposal - C. Soils - 2. North King Mining Unit - b. Soil erosion; and

III. Impacts of the Proposal - C. Soils - 3. Proposed Facilities Area - b. Soil erosion
(p. 67-68 comment 54).
(p. 69 comment 55).

GGG Please see answers BBB and CCC.

LETTER 66

HHH Section Affected: III. IMPACTS OF THE PROPOSAL

D. Vegetation
  2. North King Mining Unit
    g. Manure application

Page: III-30

Quotation from DEIS: Therefore, Montco should be required to use only composted manure.

Comment: 60. Regardless of whether composted manure is used, weed species will be introduced to the reclaimed area through natural processes. This situation is unavoidable. It should also be noted that manure used in drainageway reclamation is just as likely to contain the seeds of desirable native plant species which would aid revegetation.

HHH We agree. Please refer to rewritten text in chapter III, Vegetation.

LETTER 66

III Section Affected:

III. IMPACTS OF THE PROPOSAL

D. Vegetation
  3. Other Disturbed Areas
    a. Facilities sites

Page:

III-31

Quotation from DEIS

Far more soil is available in the facilities area than in North King mining unit. Even so, the company is proposing, as in the North King unit, to salvage some unfavorable soil along with the favorable. This could adversely affect plant establishment and vigor. Montco should therefore avoid salvaging such materials (see Soils).

Comment:

61. The soils existing there now are supporting a native plant community. Montana law requires restoration of the land to its premining capability with such species. Even though the soil materials may not be as suitable as in other regions, they should be utilized whenever possible to aid in revegetation. Montco believes the land can be restored by using the resources which exist there now with the assistance of reclamation/revegetation techniques.

Also, see Montco's previous three comments on:

III. Impacts of the Proposal - C. Soils - 2. North King Mining Unit - a. Soil cover, depth, and quality (entire section).
(p. 61-62 comment 51).
(p. 63-64 comment 52).
(p. 65-66 comment 53).

III Please see answers A, YY, ZZ, and AAA.

LETTER 66

JJJ **Section Affected:** III. IMPACTS OF THE PROPOSAL

F. Wildlife
1. Summary of Impacts

Page: III-33

Quotation from DEIS:

In the long term the composition of habitat types would shift toward big sagebrush/grassland types, resulting in a loss of cover for big game species.

Comment:

62. Montco has committed to replace an equal number of acres of the Ponderosa pine/juniper community during reclamation activities as existed prior to mining. Further, this commitment extends to the monitoring and maintenance of the area to ensure that stability of this habitat type is accomplished. Given these facts, the DEIS statement appears unfounded.

JJJ **The increase in big sagebrush/grasslands corresponds with a decrease in breaks habitat (table III-4). The summary has been revised.**

LETTER 66

KKK Section Affected: III. IMPACTS OF THE PROPOSAL

F. Wildlife
2. Description

Page: III-34

Quotation from DEIS:

One of the immediate changes with the Montco Mine plan area would be loss of habitat from loss of vegetative cover. This would eliminate (for the most part) wildlife use of the area.

Comment:

63. This suggests that the entire mine plan area would be eliminated from wildlife use. These sentences should be revised to read as follows:

One of the immediate changes within the Montco Mine plan area would be the loss of habitat due to the loss of vegetative cover. This would eliminate (for the most part) wildlife use of the disturbed areas.

KKK The sentences have been revised.

LETTER 66

LLL Section Affected:	III. IMPACTS OF THE PROPOSAL F. Wildlife 2. Description
Page:	III-34
Quotation from DEIS:	As a result, some of the reclaimed cuts may not receive optimum use by mule deer until ponderosa pines become established, owing to the lack of security without tree cover.
Comment:	64. This statement does not consider the abundant, undisturbed pine cover immediately adjacent to some mine units, such as the NKMU. These areas may provide sufficient security cover for deer to utilize reclaimed areas more effectively.

LLL Optimum use of an area is attained when deer satisfy life requirements with minimal travel. The additional travel required to off-site pine cover, therefore, precludes optimum use.

LETTER 66

MMM Section Affected: III. IMPACTS OF THE PROPOSAL

F. Wildlife
2. Description

Page: III-34, III-35

Quotation from DEIS:

Fifty percent of the winter mule deer sightings were within breaks habitat.

Comment:

65. It should be noted that most of the mule deer observations made during the winter of the baseline study period were from outside of the mine plan area. According to Table G-7 of the Terrestrial Wildlife Baseline Report, only 38 percent of 334 winter sightings came from the intensive study area (mine plan area) plus the two-mile buffer. The data from the baseline report, plus statements made on page II-34 of the DEIS, indicate that breaks habitat within the mine plan area is not particularly important to mule deer.

MMM Chapter II has been revised to indicate the study area used in habitat analysis. Table G-7 (baseline report) shows that 38 percent of mule deer were sighted in the breaks habitat within the mine plan area and two-mile buffer. Also, the baseline report (page G-48) states that mule deer selected for the breaks in this same area. Using 38 percent rather than 50 percent would not change the conclusion regarding the importance of the breaks to mule deer.

LETTER 66

NNN **Section Affected:** III. IMPACTS OF THE PROPOSAL

F. Wildlife
2. Description

Page: III-35

Quotation from DEIS:

The reclamation plan would establish the original acreage of premining habitats; however, the habitats would be in larger blocks than before mining. The result would be a reduction in habitat interspersion and "edges".

Comment:

66. The basis of this comment is correct. A reduction in edges will occur. It must be noted, however, that the "edge effect" has been incorporated into the Reclamation Plan through the distribution and areal association of the vegetation communities to be re-established. The siting of these communities was completed by a wildlife biologist considering wildlife needs and equipment logistics.

In terms of logistics, the size and shape of the communities must permit efficient equipment (i.e., harrows, seed drills, etc.) use. More complex "edges" than proposed could interfere with equipment operation and production rates resulting in inefficient and/or delayed revegetation. This is true not only for reclamation occurring during a specific year but also where vegetation communities must be extended and joined from mining year to mining year.

NNN The revised text recognizes Montco's efforts to create edge habitat. Despite those efforts, the expected reduction in edges would still decrease wildlife habitat quality.

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In summary, Montco believes that the "edges" created as a result of the proposed Reclamation Plan are a functional and efficient compromise between wildlife needs and equipment logistics.

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000 Section Affected: III. IMPACTS OF THE PROPOSAL

F. Wildlife
2. Description

Page: III-35

Quotation from DEIS:

Activity on the North King mining unit and associated facilities would disrupt two travel lanes used in movements from Tongue River bottomlands to Custer Forest uplands. As a result, the deer would have to move to the south or north to reach winter range.

Comment:

67. This statement suggests that activity on the North King mining unit and associated facilities would interrupt seasonal movements for deer. This has not been substantiated by wildlife studies and the statement should be modified to read as follows:

Activity on the North King mining unit and associated facilities could disrupt two travel lanes used in autumn from Custer Forest uplands to Tongue River bottomlands. As a result, the deer travel would be displaced south or north during autumn.

000 This disruption of travel lanes would occur (based on maps VI-2 and G-9 of Montco's application). Although the exact response of deer cannot be predicted, the sentence has been reworded to reflect more current analyses. Montco's proposed mitigations are now included in the text.

LETTER 66

PPP Section Affected: III. IMPACTS OF THE PROPOSAL

H. Air Quality
1. Summary of Impacts

Page: III-36

Quotation from DEIS:

Montana and Federal AAQS would continue to be exceeded in Ashland -- lower-respiratory illness and reduced lung function in children may thus increase. The major sources of TSP would be traffic on FAS 566 from Ashland to Montco Mine entrance.

Comment:

68. Respiratory illnesses are associated with airborne particles in the respirable size range, while it is widely recognized that fugitive dust is primarily composed of very large, nonrespirable particles that fall out a very short distance from the source. Unless there are published data to show that the above quotation is factual, it should be revised to read:

Montana and Federal AAQS would probably continue to be exceeded in Ashland as a result of the existing sources. Additional fugitive dust could be expected to result from traffic on FAS 566 from Ashland to the Montco Mine entrance.

PPP As referenced in the EIS, research indicates there is a relationship between TSP and respiratory function. The monitoring data submitted in Montco's permit application contradicts your statement "Fugitive dust is primarily composed of very large, nonrespirable particles that fall out a very short distance from the source." The size-segregated particle data show that, annually, 90 percent of the particulate at the landing field site and 87 percent at Birney Day Village was less than 7.2 microns in diameter. There are no point sources of particulate in the vicinity; therefore, this is fugitive dust, and almost all of it is well below the 15-micron size, generally considered to be cutoff limit for fine particles of respirable size.

LETTER 66

QQQ **Section Affected:** III. IMPACTS OF THE PROPOSAL

L. Fiscal
2. State

Page: III-71

Quotation from DEIS:

The proposed mine, like other mines in the cumulative scenario, would generate State revenues primarily through the Coal Severance Tax, the Resource Indemnity Trust Tax, personal income taxes paid by miners, property taxes paid into the Equalization Fund of the State School Foundation Program, and royalties from State coal.

Comment:

69. Montco would also be paying the Gross Proceeds tax. See Montco's comment on III. Impacts of the Proposal - L. Fiscal - 2. State.
(p. 85-86 comment 70).

QQQ The text has been revised to include mention of the Gross Proceeds Tax.

LETTER 66

RRR **Section Affected:** III. IMPACTS OF THE PROPOSAL

L. Fiscal
2. State

Page: III-71

Quotation from DEIS:

Assuming a contract sales price of $7.50 per ton (1980 dollars), the mine at full production would pay Coal Severance Taxes of about $27 million per year. Other coal taxes would provide an additional $700,000 per year. Over the life of the mine, these taxes would amount to about $428.3 million.

Comment:

70. Assuming a contract sales price of $7.50 per ton (Production taxes are excluded from the contract sales price) over the life of the mine taxes would be approximately:

(1) Montana Coal Taxes
Severance Tax
0.3 x $7.50 x 186 MMT = $418,500,000

Resource Indemity Trust Fund
.005 x $7.50 x 186 MMT = $ 7,000,000

Gross Proceeds Tax
0.45 x .009 x $7.50 x 186 MMT = $ 5,650,000

Subtotal $431,150,000

(Cont.)

RRR Thank you for your comments. Please see the additional information added to chapter III, Fiscal, on tax revenues. Note that since the Abandoned Mine Reclamation fee expires in 1991, Montco would pay only $8.75 million for this tax (rather than $65.1 million) unless the fee is reimposed.

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(2) Federal Coal Taxes	
Black Lung Excise Tax	
$0.50 x 186 MMT	= $ 93,000,000
Abandoned Mine Reclamation Fund	
$0.35 x 186 MMT	= $ 65,100,000*
Subtotal	$158,100,000
(3) County Taxes	
Gross Proceeds Tax	
0.45 x 0.129 x $7.50 x 186 MMT	= $ 81,000,000
Property Tax	= $ 8,000,000
Subtotal	$ 89,000,000
(4) Federal & State Corporate Income Taxes	= $106,000,000
TOTAL	$784,250,000**

* 50% ($32,550,000) will be returned to the State Abandoned Mine Reclamation Program.

** Does not include employee personal income and property taxes.

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SSS Section Affected: III. IMPACTS OF THE PROPOSAL

R. Irreversible and Irretrievable Commitments of Resources

Page: III-82

Quotation from DEIS:

> The groundwater that passes through the mine spoils would, for at least several thousand years after mining, be of poorer quality than existed prior to mining. One spring, the McKelvey, is anticipated to go dry. It may or may not resume flow when the postmining groundwater system is reestablished.

Comment:

71. This paragraph, taken by itself, presents an unnecessarily negative view of potential conditions which are common and expected. Reference to earlier discussions of groundwater impacts would resolve most understandings imposed by this paragraph, but to many readers of this document, the conclusions drawn will be more readily comprehended than the technical information used in reaching those conclusions. The first three sentences in this paragraph should thus be modified to read:

Following mining, the groundwater system will be reestablished, flowing through the backfilled spoil material. Although the potential effects may last several thousand years after mining, the quality of the groundwater flowing through the spoils is predicted to be generally

SSS Your comment is noted, and we are in general agreement. It is worth pointing out that such impacts are commonly associated with surface coal mining in southeastern Montana and are not just a characteristic of Montco's proposed mine. Also, alternative water supplies are available throughout the mine area.

LETTER 66

within the premining range for coal and interburden groundwater units in the Montco mine plan area. Predicted highs for total dissolved solids in spoils groundwater exceed the measured highs for premining coal and interburden waters, but are still less than the assumed value of 10,000 mg/l used by Montco in estimating the mining effects on Tongue River water and its alluvial water. Though potentially long-term, the effects of the Montco mine on groundwater are anticipated to be minimal in the vicinity of the mine, and negligible with respect to regional ground and surface water impacts. One spring, the McKelvey Spring, lies near the mine plan area and may be affected by mining. If McKelvey Spring does go dry as a result of mining, it may or may not resume its flow after mining is completed.

LETTER 66

TTT Section Affected: III. IMPACTS OF THE PROPOSAL

S. Short-Term Uses Versus Long-Term Productivity Of The Lands Affected By Mining

Page: III-83

Quotation from DEIS:

Reductions in long-term productivity would be minimal. Maximum potential vegetative productivity of the reclaimed lands would probably not be as high after mining as what could have been achieved prior to mining under optimum management.

Comment:

72. It should also be noted (as previously stated in the DEIS) that production of the reclaimed lands may actually be greater than that of the premining condition. Therefore, reclamation could have a very positive impact on the productivity of the area as a whole. Optimum management of such a resource could continue to promote long-term benefits even if potential productivity only assumed premining levels.

TTT Your comment is noted. Thank you.

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UUU Section Affected:	III. IMPACTS OF THE PROPOSAL S. Short-Term Uses Versus Long-Term Productivity Of The Lands Affected By Mining.	UUU See answer RRR and revised text.
Page:	III-83	
Quotation from DEIS:	From 1985 through 2005 the Montco Mine would pay a total of about $418.7 million in state severance taxes, about $10 million in local coal taxes, $102.5 million in Federal coal taxes, and about $100 million in state royalties. In addition, increased revenues from property taxes would make it easier for local school districts and Rosebud County to finance their operations.	
Comment:	73. See Montco's comment on III. Impacts of the Proposal - L. Fiscal - 2. State. (p. 85-86 comment 70).	

LETTER 66

VVV Section Affected:	IV. ALTERNATIVES TO APPROVING THE PERMIT AS PROPOSED D. Approval of the Permit with Stipulations or Mitigating Measures 1. Geology
Page:	IV-1, IV-2
Quotation from DEIS:	To determine the danger of toxicity to plants from nickel, the company could note pH values during backfill sampling of the overburden. If the pH of a sample were less than 7.0, the material could be analyzed for nickel and, if levels were high, buried under nontoxic material.
Comment:	74. See Montco's comment on III. Impacts of the Proposal - A. Geology - 5. Overburden - b. North King mining unit - 3) Potential problems with selective overburden handling. (p. 44-45 comment 37). (p. 42-43 comment 36).

VVV The "Mitigating Measures" section has been changed and is now located at the end of the Geology, Overburden, section in chapter III. Also, please see answers JJ and KK.

LETTER 66

WWW Section Affected: IV. ALTERNATIVES TO APPROVING THE PERMIT AS PROPOSED

D. Approval of the Permit with Stipulations or Mitigating Measures
1. Geology

Page: IV-2

Quotation from DEIS:

The trace element molybdenum (Mo) significantly exceeded the State suspect level in about one third of the core lengths tested in the South Gate mining unit. To avoid molybdenosis in cattle and sheep, Montco could, first, analyze all backfill samples in this area for molybdenum, and second, bury and replace with suitable overburden all material approaching or exceeding 1.0 part per million in molybdenum. In addition, leguminous plants, which are known to accumulate molybdenum, should not be included in the revegetation seed mixture for this unit.

Comment:

75. See Montco's comment on III. Impacts of the Proposal - A. Geology - 5. Overburden-c. Other mining units - 4) South Gate mining unit.
(p. 50-51 comment 42).

WWW This mitigating measure has been revised and is now located at the end of the Geology, Overburden, section in chapter III. Also, please see answer PP.

LETTER 66

XXX Section Affected: IV. ALTERNATIVES TO APPROVING THE PERMIT AS PROPOSED.

D. Approval of the Permit with Stipulations or Mitigating Measures
1. Geology

Page IV-2

Quotation from DEIS

To ensure that contaminated material does not mix with favorable overburden, the company should construct two stockpiles, one for the favorable and one for the unfavorable material.

To ensure that overburden placed in the rootzone is of adequate quality, Montco could analyze samples of the overburden as it is mined, or increase the backfill sampling rate to one sample or more every acre, as opposed to the usual requirement of one sample every two acres.

Comment:

76. Montco proposes to segregate favorable from unfavorable overburden in the NKOB stockpile (see Montco's comment on III. Impacts of the Proposal - A. Geology - 1. Summary of Impacts). (p. 34-35 comment 32).

XXX This mitigating measure has been deleted due to Montco's changes in its permit application. See the revised discussion of the overburden stockpile in chapter III, Geology, Overburden.

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YYY **Section Affected:** IV. ALTERNATIVES TO APPROVING THE PERMIT AS PROPOSED

D. Approval of the Permit with Stipulations or Mitigating Measures
  1. Geology

Page: IV-2

Quotation from DEIS:

Area-wide settlement and localized subsidence and collapse may occur on the postmining landscape. To minimize this, Montco could use only scrapers for the recontouring operation and avoid recontouring during the winter, late fall, and early spring months, when the overburden may be frozen.

Comment:

77. See Montco's comment on III. Impacts of the Proposal - A. Geology - 2. Topography and Geomorphology - b. Postmining landscape stability (entire section). (p. 38-39 comment 33).

YYY This mitigating measure has been deleted. Please note answer GG.

LETTER 66

ZZZ Section Affected: IV. ALTERNATIVES TO APPROVING THE PERMIT AS PROPOSED

D. Approval of the Permit with Stipulations or Mitigating Measures
   3. Soils

Page: IV-3

Quotation from DEIS

To minimize soil loss, Montco could crush the scoria before respreading it.

Comment: 78. See Montco's three comments on III. Impacts of the Proposal - C. Soils - 2. North King Mining Unit - a. Soil cover, depth, and quality.
(p. 61-62 comment 51).
(p. 63-64 comment 52).
(p. 65-66 comment 53).

ZZZ This mitigating measure has been deleted due to additional data provided in Montco's revised permit application. Please see the discussion on burn material in chapter III, Geology, Overburden.

LETTER 66

AAAA **Section Affected:** IV. ALTERNATIVES TO APPROVING THE PERMIT AS PROPOSED

D. Approval of the Permit with Stipulations or Mitigating Measures
   3. Soils

Page: IV-3

Quotation from DEIS:

Placement of sandy-textured soil on slopes greater than 10 percent or in drainages could lead to accelerated soil erosion and vegetation loss. To minimize this loss, the company could identify sandy-textured material, store it separately, and place it on slopes of less than 10 percent and outside drainages.

Comment:

79. See Montco's comment on III. Impacts of the Proposal - C. Soils - 2. North King Mining Unit - b. Soil erosion. (p. 67-68 comment 54).

AAAA Please see answer BBB.

LETTER 66

BBBB Section Affected: IV. ALTERNATIVES TO APPROVING THE PERMIT AS PROPOSED

D. Approval of the Permit with Stipulations or Mitigating Measures
   6. Fiscal Conditions

Page: IV-6

Quotation from DEIS:

The adverse fiscal impacts caused by mine development arise from either poor distribution of tax revenues among affected jurisdictions or receipt of revenues well after they are first needed. To mitigate these adverse effects, Montco could take any of the actions listed below, based on the 1981 report by Mountain West Research, Inc.

§ Prepay taxes, thus placing tax revenues up front, when the funds are required.

§ Assist local government in financing required expenditures by purchasing bonds, implementing third-party leases, or making direct payments.

To further mitigate fiscal impacts, local jurisdictions could establish joint powers to allow sharing of tax revenues.

Comment:

80. -1. Corporate prepayment of taxes has been used in several instances, however, in Montana corporations feel that the 30% severance tax should pay for all impact mitigation, and the State is reluctant to do anything further. It is also true that for a given corporate expenditure, local governments get twice as much revenue from production, or severance taxes than prepaid taxes. This is

BBBB Your comments are noted. Thank you.

LETTER 66

due to the nature of Federal tax codes under which prepaid taxes become capital investment and are depreciated. There is also a problem with the spatial distribution of impact. It may be difficult to allocate prepaid taxes to the government entities which will actually experience the impact.[1,2]

2. The Interlocal Agreement Act allows local governmental entities to join together for specific tasks. It is very unlikely, however, that this method would be used to funnel money from the tax base to the impact area. Such tax sharing would almost have to be imposed by the State to overcome local political problems.[2]

1. U.S. Geological Survey, Department of the Interior and the Montana Department of State Lands, Draft Environmental Statement Proposed Mining and Reclamation Plan Spring Creek Mine, Spring Creek Coal Company, 1978, pp. VIII-41.

2. U.S. Geological Survey, Department of the Interior and the Montana Department of State Lands, Draft Environmental Statement Proposed Expansion of Mining and Reclamation Plan Big Sky Mine, Peabody Coal Company, 1978 pp. VIII-5.

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CHAPTER VII

CONSULTATION AND COORDINATION

RESEARCH AND WRITING

The following people prepared the EIS:

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David Stiller and Associates prepared the geology and hydrology sections of the EIS.

The Department of State Lands appreciates the assistance of Montco, which provided the EIS team with information on the proposed mine.

PEOPLE, AGENCIES, AND COMPANIES CONSULTED

The following individuals, agencies, and companies (other than those cited in the text) provided information used to analyze Montco's permit application and mine plan.

Lloyd Bender, Ph.D., Department of Economics, Montana State University

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Custer County Planning Office (Miles City)

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Arnold Silverman, Ph.D., Department of Geology, University of Montana

Sunlight Development Company (Colstrip)

U.S. Bureau of Land Management (Miles City)

U.S. Geological Survey (Reston, Virginia)

U.S. Interstate Commerce Commission (Washington, D.C.)

U.S. Office of Surface Mining (Denver, CO, Washington, D.C.)

REVIEW OF THIS STATEMENT

In accordance with the Department's regulations governing environmental impact statements (EISs), copies of the draft EIS were sent to the public for comments and suggestions. All comments received were carefully considered in the preparation of the final EIS. Written comments on the final EIS should be sent to Commissioner Dennis Hemmer, Department of State Lands, Capitol Station, Helena, MT 59620.

The final EIS is available for review in the following places:

Montana Department of State Lands, 1625 11th Avenue, Helena, Montana.

Big Horn County Public Library, 419 North Custer Ave., Hardin, Montana.

Miles City Public Library, 1 South 10th, Miles City, Montana.

Rosebud County Library, 201 North 9th Ave., Forsyth, Montana.

Parmley Billings Public Library, 510 North Broadway, Billings, Montana.

Sheridan County Fulmer Public Library, 320 North Brooks, Sheridan, Wyoming.

Powder River County Library, 102 S. Lincoln, Broadus, Montana.

A limited number of copies are available on request from the Department of State Lands, Capitol Station, Helena, Montana, 59620.

Seven hundred copies of this public document were published at an estimated cost of $12.63 per copy, for a total cost of $8,840.00, which includes $7,645.00 for printing and $1,195.00 for distribution.

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